



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

LANE MEDICAL LIBRARY STANFORD



2 45 0417 9650



EIGHTH ANNUAL REPORT
—OF THE—
PROVINCIAL
BOARD OF HEALTH
—OF—
ONTARIO.
—
1889.

185
5



Wisconsin
State Historical Society

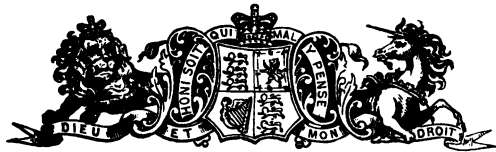
University of Wisconsin
LIBRARY
Class QR
Book .80N
Presented by P. H. H. H. H.

9

△

EIGHTH ANNUAL REPORT
OF THE
PROVINCIAL BOARD OF HEALTH
OF ONTARIO,
BEING FOR THE YEAR 1889.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.



KANE LIBRARY

TORONTO:
PRINTED BY WARWICK & SONS, 68 & 70 FRONT STREET WEST.
1890.

LAURENCE J. HARRIS

372334

CR
SON

TABLE OF CONTENTS.

PART I.

| | PAGE. |
|---------------------------------------------------------------------------------------------------------------|---------|
| 1. Introduction by the Chairman | v. |
| 2. Secretary's Report | vii. |
| 3. Municipal Health Progress | viii. |
| 4. Amendment to the Public Health Act <i>re</i> Sale of Milk and Meat | xiii. |
| 5. Report on Nuisance in River Speed, Guelph | xvi. |
| 6. Report on Outbreak of Smallpox on Pelee Island | xxxiv. |
| 7. Report on the Flour Moth (<i>Ephestia Kuhnella</i>) | xlii. |
| 8. Report on the Outbreak of Smallpox in Elgin County | liii. |
| 9. Report on <i>re</i> an Outbreak of Disease at Sandford amongst Horses | lv. |
| 10. Report on Methods of Sewage Disposal in England | lvi. |
| 11. Report on Sewage Farm at London Asylum | lx. |
| 12. Report on the Porous Carbon System for Precipitation of Sewage at Ontario Agricultural College | lxii. |
| 13. Report of the Committee on Poisons | liv. |
| 14. Report on a Nuisance arising from a Fat-rendering and Hog-feeding Establishment in York Township | lxv. |
| 15. Report on <i>re</i> a Nuisance in East Zorra from Hog-pens in connection with a Cheese Factory | lxvii. |
| 16. Report of Union School, Simcoe, County of Norfolk | lxviii. |

PART II.

| | |
|--------------------------------------------------|----|
| Annual Reports from Local Boards of Health | 3. |
|--------------------------------------------------|----|

EIGHTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

TO HIS HONOR SIR ALEXANDER CAMPBELL, K. C. M. G.,

Lieutenant-Governor of Ontario.

May it please Your Honor :

In presenting to you its Eighth Annual Report the Provincial Board takes pleasure in informing Your Honor that another year has passed without the presence in any wide-spread epidemic form of those pestilences which, as smallpox and cholera, have from time to time in years past appeared in Ontario ; and the Board has further to state that an unusual immunity from those contagious diseases, which are endemic to the Province, has marked the year that has just closed.

In the report of the Secretary to the Board, following this introduction, you will find the few small outbreaks which have occurred referred to in detail ; and in regard to the lessons which we may learn from the record of these outbreaks I would respectfully draw the attention of Your Honour to two needs to which they point. The first is the desirability of having impressed upon the public, in our urban and village municipalities especially, the necessity there is for erecting what has been found to be economically quite possible, Isolation Hospitals or "Houses of Recovery" to which cases of contagious disease can be removed, along with the mother or nurse if desirable, and there be attended by the family physician. Conclusive evidence is adduced from cities in this Province, as also from abundant experience in England, to show that the safety of the patient is thereby best guaranteed, the freedom from exposure of the rest of the family fully accomplished, and the cost of such outbreaks very materially lessened both to the affected family and the municipality. The second need is a more strict attention on the part of local health authorities, and the general public to the advantages to the public health gained by a strict attention to the law requiring the notification of the Medical

Health Officers of any outbreak of contagious disease which occurs, thereby making a removal of diseased persons by the Local Board from infected and unhealthy premises possible, and giving such officers an opportunity for investigating those local causes tending to the production of such diseases.

It is most satisfactory to note from the review of the subject contained in the Secretary's report the great progress which municipal sanitary authorities are making in matters of public water supplies and sewerage systems.

These works are especially indicative of an advance in municipal knowledge of the needs belonging to aggregations of people in urban communities, and in the executive ability required to set in operation such public works as these necessities demand.

Nothing, however, is more valuable as seen by the reports of Local Boards and the *resume* of the Board's operations by the Secretary, than the broadening field which yearly is opening up for the work of the Provincial Board. Animal diseases received last year a large share of the Board's attention; pests, such as the 'moth pest' are being carefully investigated, and the geological and biological relationships which affect the amount and character of our water supplies are becoming increasingly prominent portions of the Board's work, as the facilities for investigating and collecting information regarding them grow in extent and definiteness.

The development of this scientific and executive work on the part of the Board is most desirable, and is wholly in the direction in which such Boards as the Local Government Board of Great Britain, and those of the most advanced continental countries have been diligently directing their work for a number of years past. Massachusetts, Illinois, Minnesota, Michigan, and all those neighboring states most advanced in sanitary work are directing their energies in this direction, and the needs of the Province and its reputation for progress equally require that increasing attention be given to the work of scientific investigation of disease.

Your Honor will find from the reports of Local Boards in the Appendix that these organizations are extending and that they are readily seconding the efforts which the Provincial Board of Health is making by taking prompt action in those instances where-ever threatening epidemic diseases appear, or where nuisances of an aggravated character become a menace to the public health.

In conclusion we commend the work of the Board, partaking so largely of a benevolent and philanthropic nature, to Your Honor's distinguished consideration and feel assured that the same support and approval given in the past by your government will be maintained and increased in the future.

I have the honor to be,

Your obedient servant,

FRANCIS RAE, M.D.,
Chairman.

REPORT OF THE SECRETARY.

To the Chairman and Members of the Provincial Board :—

GENTLEMEN,—In recalling to your remembrance the events which have taken place in the history and work of the Board during the year 1889, while it would be the natural order of procedure to refer first to those matters of a general character, affecting the Province at large, yet I am certain that I shall be pardoned if, before passing to these general matters, I refer to those personal losses, which in common with yourselves I have suffered, in the removal by death of those two, our dear friends and colleagues, Dr. Horace P. Yeomans, of Mount Forest, and Dr. Hugh M. Mackay, of Woodstock. To the words of the resolutions adopted at the quarterly meeting succeeding their sudden and unlooked for deaths, I can add nothing but desire to embalm them in this volume of the Board's proceedings, as a fitting tribute to the memories of these, the first two gentlemen whom death has taken from its roll of membership since the Board's formation ; and I doubt not that to those of us who are left and to others who may come after, this testimony to the worth of two such men, thus removed, may serve as a stimulus whereby their virtues may be emulated.

Moved by Dr. Covernton, seconded by Dr. Cassidy : That the recent lamented death of our esteemed colleague Dr. Yeomans calls for the expression of the deepest sympathy of the members of this Board, who from its first creation by the Provincial Government of Ontario have experienced the greatest pleasure in the frequent intercourse that the work of the Board afforded them for gaining an intimate knowledge, not only of his great worth as a man, but also of his professional acquirements which were of the highest order.

His pleasant, genial manners, aptitude in debate and experience in municipal law, were of the greatest possible assistance to his colleagues, and during the period of eight years he was ever found to be a careful and intelligent co-worker in the trust committed by the Government to the members appointed for the special purpose of diffusing among the people of our Province a knowledge of the sanitary precautions requisite for guarding the people from the spread of infectious disease.

The great ability and scholarship displayed by Dr. Yeomans while associated with other members of the Board in preparing a manual of hygiene specially intended for teachers, scholars, and the general public, were particularly conspicuous. Our lamented friend it may also be mentioned took more than ordinary interest in the "hygiene of schools," every needed particular of which was most carefully studied by him as was instanced in an admirably written essay on this subject, read on the occasion of the Twelfth Annual meeting of the American Public Health Association convened in the month of October, 1886, in our City of Toronto, the terse but yet thorough treatment of this subject being most highly commended by the members of the Association assembled from every State of the Union, as also from the different provinces of the Dominion of Canada, which paper was subsequently published in the twelfth volume of their Transactions. Into various inquiries as to the causes of outbreaks of disease in different parts of our province, that were from time to time assigned to him, the same searching and patient spirit of investigation was uniformly displayed. In the sudden loss of so valued a colleague we fully recognize what this painful deprivation of so loving a husband and father must be to the bereaved widow and family, to whom the members of this Board respectfully desire to tender their deepest sympathy and request the secretary to send a copy of this resolution to the family of our deceased confrere.

Moved by Dr. Covernton, seconded by Dr. Macdonald, and resolved :

That the Provincial Board of Health having heard with deep regret of the death of Dr. Hugh M. McKay, one of its members, takes this the first opportunity to express its sincere sorrow at his unexpected removal. His friends and coadjutors of the Board beg to convey to his widow and family their warm sympathy in their affliction. Dr. McKay's genial disposition had endeared him to his associates in the Board, while his professional attainments, and his ready zeal in the duties incidental to his position had impressed them with the utmost esteem for their deceased friend as an accomplished physician and a helpful officer. In the presence of the greater family affliction the Board will not venture to speak of its own loss by the removal of two of its youngest and most active members, but in their absence it will miss esteemed friends and earnest fellow-labourers.

Integer ævi! The despatches said,
 "Worn out physicians!" Two now lie dead;
 Died in their prime,—yet a wide influence won!
 A breath from th' Unseen—and earth's work is done!

Integer mentis! To the very last,
 So our letters run, life's stream coursed fast;
 Clear brain, firm hand hewed close to the line:
 Earth's frail bands are burst; now free, they're Divine!

Integer vitæ! So in sadness we
 Speak of them, as gazing out to sea
 We watch the dark barge vanish, with the dead:
 'Tis the life that speaks. All unsaid is said!

1. Municipal Health Progress.—The work of the Board during the year which has closed has again been marked by a steady progress in what most especially tends to develop internal sanitation in all that pertains to preventing disease and removing causes already in existence. The progress of municipal sanitation, aided incidentally by the accident of epidemic outbreaks of disease, is however to be looked for with an increasing knowledge of the causes of disease, in every community marked by a progress in education and commerce; and it might perhaps be said that advanced municipal sanitation may be taken as the most accurate of all methods for estimating the degree of the social evolution of any community. So-called education may be but the repetition of mediæval scholasticism, without any direct bearing upon the practical problems of daily life; commercial activity may be developed along lines based upon unsound economic principles, but wherever the health of the citizen is preserved and improved, by the restriction of contagious disease, by the returning of effete matters to the soil for replenishing its exhausted stores of plant food, or by supplying to every citizen an abundance of wholesome water and food, an advance in the personal, social and industrial progress of a community is the necessary and inevitable result. Such work has, in a special degree marked the history of the past year of public health work in the Province. Remembering as we must, the special conditions which have for several years affected the progress of the individual communities going to make up the 700 municipalities of the Province, it is a matter of agreeable surprise to find how in many instances, under circumstances other than favorable, municipal sanitary improvement has more than kept pace with commercial progress.

The period since the creation of a Provincial Board of Health in Ontario has been marked by several conditions unfavorable to the consideration of large schemes of municipal improvement. During 1881 and for several years since, an internal movement of population amongst the rural municipalities has resulted in an actual loss of population if we take one per cent. as the natural annual increase of a population not affected by any special causes as war or pestilence. This depopulation has consisted in large measure of the active workers of the community, viz., the young farmers, who have gone to the North-West or elsewhere to settle upon new lands. How great is the influence thus exerted on the municipal evolution of every community need not be discussed; but its sequence is seen in the fact that little less than one-fifth of the whole agricultural lands of the Province are in the hands of tenants who pay less than five per cent. on the marketable values of

the whole cleared lands. When we further add to this the fact that prices of many farm products have steadily declined during this period and that the average yield of most grain-crops has also fallen off, it seems little short of wonderful that municipal health organizations should have attained a status in these years, such as to practically enable us to say that every township discusses with some degree of care, the problems of the public health.

It is apparent, as we have said, that these years have marked a transition period in the history of the Province, which it is to be hoped, with changing methods of agriculture, such as the development of cattle-raising, dairying, etc., will create an increased production of wealth—even though the population do not increase.

Having stated these facts, it is interesting to turn to the records, found in the published reports of Local Boards in Appendix, and see what these Boards have been doing.*

It is further worth while to observe how in spite of the fact of the very slight increase in population in most urban municipalities we have the most marked evidences of an advance in municipal organization and appreciation of the principle which underlies social progress—that there are many matters which tend towards individual progress, comfort and health which can be much better accomplished by co-operation, whether by what are called mutual benefit societies or by that represented by municipal government. In spite of sociologists who teach the doctrine of individualism, we find that in England, the home of such theories, municipal government has reached an almost ideal development, and we have had recently set forth in the new Local Government Bill, provisions whereby matters of minutest detail, having a direct bearing upon the general or social welfare, are provided for.

The Local Government Act of 1888 is remarkable in the extent to which the powers laid upon it go. Primarily its object was the establishment in every county of a council to whom should be entrusted the management of the administration and financial business of the county. The council has a chairman, aldermen and councillors elected for three years. There are 616 counties based upon a minimum population of 50,000, i.e., towns or boroughs of 50,000 or over, may have separate organization. Amongst the public health powers are the enforcement of the Rivers Pollution Prevention Act (1876). London is a county for the purposes of this Act. They may make by-laws for the prevention and suppression of certain nuisances and they may appoint a medical officer of health.

They may sub-divide and alter sanitary areas within their boundaries, subject to approval by the Local Government Board. Powers to purchase compulsorily, subject to the approval of the same authority, for sanitary purposes is likewise given to these councils; while the Local Government Board may constitute for special purposes all the councils administering along a river or a portion of a river for sanitary purposes.

The Local Government Board has further power to prescribe the qualifications and duties of a medical officer of health and also regulations in regard to the appointment, salary and tenure of office of a medical health officer.

Section 18 of the Act dealing with appointments such as the above provides that after 1st April, 1889, no person can be either medical officer of health or his deputy for any district in the metropolis without being qualified to practice medicine, surgery or midwifery, and that after 1st of January, 1892, no person can be appointed to either of the above positions unless in addition to above qualifications he is registered in the Medical Register as holding a diploma in state medicine, or has been during three consecutive years a medical officer of health, or a Local Government Board inspector.

Now if we compare the multifarious subjects which are legislated upon by our Provincial parliament, with the powers and duties laid upon the county councils under the Local Government Act, it may be said that apart from the larger constitutional questions, there is a close analogy between the legislation to be carried out by the Local

* See Local Boards for Townships on page 60.

Legislature and the county councils under the Local Government Act, for it must be remembered that it is not territory but the needs of the people of any community which must be provided for ; and the density of population in some Local Government districts is comparable to that of our Provinces. The same differences indeed are to be seen in different provinces of Canada, for whereas in Ontario, township government is useful in older settled districts, yet a union of townships has been found convenient in newly settled districts, and county boards are found sufficient in Manitoba.

a. Public Waterworks.—Reverting to the work of urban districts in public health matters, it is interesting to note in how many places the need of a public water supply has made itself felt, and how in numerous instances active steps have been taken to supply the want.

Thus the following imperfect list shows how progress in this work is being made, since public waterworks have been constructed in each.

| | | |
|-------------|----------------|-----------------|
| Belleville. | London. | St. Catharines. |
| Berlin. | Merritton. | St. Thomas. |
| Brampton. | Milton. | Sarnia. |
| Brantford. | Mitchell. | Seaforth. |
| Brockville. | Morrisburg. | Stratford. |
| Cobourg. | Niagara Falls. | Tilsonburg. |
| Cornwall. | Orangeville. | Tilbury Centre. |
| Dundas. | Ottawa. | Toronto. |
| Goderich. | Owen Sound. | Uxbridge. |
| Guelph. | Paisley. | Welland. |
| Hamilton. | Paris. | Wiarton. |
| Iroquois. | Picton. | Windsor. |
| Kingston. | Port Hope. | Wingham. |

b. Sewerage and Drainage.—Following as a necessary sequence to a public water supply is the construction of a system of sewerage. In this it may fairly be said that if the same progress has not been made as in the matter of public water supplies, a progress equal to if not greater than in any other state on the continent is seen. Thus we have systems of sewerage in

| CONSTRUCTED. | | UNDER CONSTRUCTION. |
|---------------------|---------------------------|------------------------|
| Barrie, (partial). | Niagara Falls, (partial). | St. Thomas, (partial). |
| Belleville. | London. | Tilsonburgh. |
| Brantford. | Ottawa. | Toronto. |
| Brockville. | Peterboro', (partial). | Windsor. |
| Hamilton. | Port Arthur. | Woodstock, (partial). |
| Kingston. | St. Catharines. | |
| Lindsay, (partial). | St. Thomas. | |

However partial or imperfect these systems may be, it is indeed gratifying to note that through the labors of this Board and the development of the work of the Local Boards, both greatly aided by the active work of the Association of Executive Health officers, the progress being made is along the lines of the most approved modern methods of sanitation. To illustrate by a single case, which might serve as a model for all other towns and cities, the case of the City of Brantford may be cited. In 1888 the question of a public water supply was strongly urged, and as may be seen from the report of its Local Board for that year, a strong argument was found in the large number of cases of enteric fever which had prevailed. A careful investigation of the several possible sources of supply was made, and a selection of the source for a public water was made. During 1889 the works were carried forward and completed at a cost exceedingly satisfactory to the city.

The necessity for dealing with the sewage of the city, at once became apparent; and a steady and persistent agitation for the construction of sewerage works has since been carried on. In view of the fact that the water works were still under construction, the city might have been fairly excused for delaying the consideration of another scheme pointing to an expenditure of large sums of money. Yet owing largely to the persistent presentation of the most modern and at the same time economical method—the separate system—by the Local Board, and its Medical Health officer, surveys and a complete plan, making provision for the disposal of the sewage have been endorsed by the people, and measures looking to its immediate construction are being carried out. The annual report of the Local Board outlines the plan very fully; and what is there found may well serve as a basis of action for other places where such schemes are under consideration.

c. Soil Drainage.—In connection with the sewerage systems of towns in Ontario in almost every instance of which we are aware, a most important point bearing upon the healthfulness of houses has been neglected, viz: the matter of sub-soil drainage. Oddly enough, while the principle of sub-soil drainage has been carried into practice to a considerable extent throughout the Province, with a view to the healthy growth of plant life, and while extensive operations in western districts have been undertaken with a view to the reclaiming of drowned lands, there has been an almost total ignorance—or at any rate an ignoring—of the principle in its relation to human life in the sanitation of our towns and cities. Every where, almost, that sewers have been constructed there seems to have prevailed the idea that once a glazed tile for carrying house sewage, with storm, water and cellar drainage, has been laid, every necessary precaution has been made for subsoil tile drainage. Yet a moment's consideration will cause everyone to see that a close-jointed sewer pipe laid in a tenacious blue clay such as that underlying Toronto will scarcely at all aid in the sub-soil drainage of the extensive area of the city; and yet I do not think I am wrong in stating that in no instance during the many miles of sewer pipes laid in this city during the past five years has any provision been made for carrying off subsoil waters. How great the necessity for this is, may be seen in the fact that for the proper drainage of soils and the lowering of ground waters for farming purposes, main tile drains and laterals varying from 5 inches to 2½ inches diameter, are systematically laid at intervals not exceeding usually 60 feet. Similarly in the report of the engineer for Brockville, we find that two five inch field tile drains laid in the same trench and at the depth of the street sewer are necessary to properly convey away subsoil water and cellar drainage.

Not to mention the first immediate benefit in draining cellars and keeping house foundations dry, an incidental and notable advantage is gained in road-making, since by these deep subsoil drains a most effective means is employed for keeping dry the road bed. This very fact alone would be found of immeasurable value in preventing the rapid destruction of block pavements and asphalt, on the one hand by preventing hoisting with the frost and on the other in the case of block pavement by a retardation of the decay which is found to so rapidly destroy them. This dampness of soil as a cause of disease has been recognised but in no case better illustrated than by Dr. Buchanan, chief officer of the Local Government of Great Britain, who has pointed out that sewerage and drainage had most notably lessened the mortality from consumption in English towns. Thus in Salisbury the death-rate was thereby reduced by 49%, at Ely, 47% and at Rugby, 42%. It has similarly been shown from Ontario mortality returns that this disease caused in the Niagara peninsula, a flat district with heavy clay soil, in the same year 12.7% of the total deaths, or 1.64 per 1000, while in the upland central plateau district, it caused but 8.5 of the total deaths, or 1.2 per 1000 of population.

It must therefore appear from the standpoints both of economy and sanitary improvements that we are seeing a most notable advance in the methods by which the public health of our cities, towns, and villages is being promoted through the construction of systems of sewerage, whereby their effete materials are removed from that proximity to dwellings which causes them to be of all causes the most serious menace to the health of our people.

d. Inspection of Food Supplies.—Turning to another subject peculiarly belonging to the functions of municipal sanitary administration, it is interesting to note the immense strides which have been made in the supervision of the food supplies of our communities.

The matter of slaughter-houses and public abattoirs has been dealt with in several reports by committees of the Board during the several years since 1887, and legislation dealing with public milk supplies, whether as supplied directly as milk for drinking purposes or as butter and cheese, has been passed by the legislature. It will be remembered that as an outcome of this legislation, a circular letter dated Nov. 1888, was addressed to the Local Boards of Health in which a form of regulation regarding milk vendors and the inspection of milk was recommended to their attention. In the report for 1889, a tabular statement was given, showing as far as possible the extent to which the inspection of dairies, dairy cattle, and milk supplies was carried on. While the form of regulation differs slightly in different municipalities with the powers given under section 113. Public Health Act, it will be found that they are all closely in accord with the views of the Board and the medical officers of health, as set forth in their reports before the Association of Executive Health Officers.

It has been with pleasure that we have observed the large amount of technical skill which during the two past years has been devoted to this subject by the chief analyst of the Department of Inland Revenue. He has been unceasing not only in making public the most practical and exact methods for making analyses of milk, but he has further labored to establish a standard which may be generally accepted, whereby first-class milk may be known. Much, however, remains to be done in the work of determining the variations in quality which milk undergoes in animals of different breeds, with different kinds of foods, and hygienic surroundings and treatment as affecting the health of cows, and yet more in the care and treatment which the milk receives after it has been taken from the cow. Towards this latter branch of the work, of even greater importance to the public health than the first, the attention of every officer of health must be persistently and assiduously devoted. However lacking in the elements of richness the milk of a badly treated and poorly fed cow may be, it may be stated generally that, if not diseased she is likely to yield a wholesome milk. But from the moment that the milk is drawn and becomes exposed to external influences, it is placed in a wholly different category. If a water taken from the ordinary well contains invariably microbes of different species, it is much more certain that a milk placed in vessels washed by such water, unless when boiled is at once inoculated by such bacteria as it contains. Add to this the different atmospheres to which it is exposed from that of the stable to the kitchen or cellar in which it is kept prior to consumption, and we gain some adequate idea of the dangers of serious contamination to which it is exposed. Medical officers of health may fairly be excused if they should appear to be cranks on such a subject. Their teaching on the subject of cleanliness as regards milk may well be incessant; by circulars distributed to householders, by frequent examinations, not only of the butter fat, but also of the dairies and their surroundings, their water supplies, the places where the milk is stored, the cans and other vessels in which the milk is kept, and by following it into the very hands of the consumers, they will gain such information and convey such lessons as will produce results of untold benefit to the consumer and to the health of the whole community.

The reports resulting in legislation with a view to the prevention of adulterated and unwholesome milk being supplied to dairies have already been referred to. This may be considered as supplementing the provisions provided in the by-law known as Schedule A of the Public Health Act. To this was added in 1887, as an amendment to the Public Health Act, the provision contained in Section 65 for the periodical inspection of dairy cattle by a competent veterinarian.

A serious defect has, however, existed in this legislation from the fact that it is nowhere definitely stated what diseases in cattle constitute unsoundness within the meaning of Section 99 of the Public Health Act, by which power is given to a medical health officer

or sanitary inspector to inspect and seize all unsound animals, meat and milk in preparation for sale or exposed for sale.* The bill (No. 61) introduced into the legislature this year will serve in a large measure to remove the difficulty, and it may confidently be expected that with such powers for investigation and action as therein provided, greater care will be taken in the prevention of disease and in the treatment of diseased animals, and, undoubtedly, great benefits to the general public will result by their being protected against the injurious results arising from the use of meat and milk of diseased animals, while far-reaching benefits will accrue owing to the lessened dangers of breeding from weakly and diseased animals.

What we especially require and look for are increased facilities for the examination of meat and milk, and the extension of accurate knowledge regarding the clinical and pathological appearances of disease in the prime necessities of life.

That these matters are regulated with care in other countries to the great benefit of the public has before been pointed out; while as an illustration of this it may be stated, as quoted from the Local Government Board's (England) last annual Report, "Milk continues to be the chief subject of analysis, out of 26,344 samples of various articles of

*AN ACT TO AMEND THE PUBLIC HEALTH ACT IN RESPECT TO THE SALE OF MILK
AND MEAT FROM ANIMALS AFFECTED WITH TUBERCULOSIS.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. Section 99 of *The Public Health Act* is amended by adding the following sub-sections thereto:—

Rev. Stat. c.
205, sec. 99,
amended.

(3) Whenever a medical health officer from his own knowledge or from information received from a veterinary surgeon or other qualified person has reason to believe that any animal or the meat or milk of any animal is affected with any contagious or infectious disease named in section 2 of *The Animal Contagious Diseases Act*, chapter 69 of the Revised Statutes of Canada (1886), he may take action as provided under sub-section 1 of this section.

Medical health officer to take action when aware of disease in animals, meat or milk.

(4) Any officer of the Provincial Board of Health may similarly, at all reasonable times, carry out any of the provisions contained in this section.

Officers of Provincial board may act.

(5) The owner or other person having charge of any animal or meat, or milk of any animal affected with the said diseases, who knowing the nature of the disease, shall hold the animal or its meat or milk for human food shall be liable, upon conviction before a police magistrate or two justices of the peace, to a fine not exceeding \$50 or less than \$5 and costs; and the burden of proof that the animal, meat or milk was not intended for human food or to be sold for human food shall rest with the person charged.

Penalty for keeping diseased animals or meat, or milk for sale as food.

(6) Any person who gives such information to a health officer or shall make such complaint to a justice of the peace as shall lead to the conviction of any person for a breach of the provisions of this section shall be entitled to receive one-half of the penalty imposed upon the person so convicted, and the other half of the penalty shall be paid to the municipality in which the offence was committed.

Half of penalty to be paid to informer.

(7) Upon any prosecution under sub-section 5 of this section it shall be competent for any medical health officer to make or cause to be made or request the Provincial Board of Health to make, at the cost of the municipality, such scientific examination of the animal, meat or milk suspected of being diseased as may enable the court to determine whether or not such diseases exist; and the Minister of Agriculture may instruct the secretary of the Board or other person acting under the board to make such investigation, and the expenses of such investigation shall be supplied out of the moneys set apart by the Legislative Assembly for the investigation of contagious diseases. A fee, which shall not in any case exceed \$10, shall be payable for the examination of any tissue, meat or milk under the provisions of this sub-section.

Scientific examination of tissue meat or milk upon prosecution.

food, drink and drugs, no less than 10,859 were of what professed to be milk, of which 11.9 per cent. were condemned." "While in one of the London districts, St. Pancras, out of 129 samples, no less than 55, or nearly 43 per cent. were condemned."

The following instance illustrates the enormity of the crime of adulteration and the inadequacy of the fine to prevent adulterating :

"In another case in which the vendor of milk stated that he rarely sold more than a farthing's worth at a time, the sample taken was found diluted with 15 per cent. of water, but the magistrate considered that one shilling was an adequate fine. On this decision the public analyst comments as follows :—"It is these small portions of milk which are used to fill the bottles of young children, and are often diluted by the parents after the purchase, and thus it is impossible to say how weak the milk becomes before the same is used, but it is not very difficult to understand why the mortality amongst the children of the poor is so great."

c. Abatement of Nuisances.—Associated very closely with the question of sewage disposal, which we have already referred to, is the matter of nuisances, commonly the result of defective measures for the removal of solid organic matters, whether in the shape of excreta or the numerous refuse products incidental to the habitations of men everywhere, but chiefly in those places where aggregations of populations exist. That it is not, however, alone where aggregation of population is present, is seen in the fact that around the poorer class of farmhouses garbage heaps and even manure heaps are allowed to accumulate to a degree seldom reached in the most thickly populated towns. It might, perhaps, be said, however, that the places where nuisances become most general are in the villages and in smaller towns, where municipal sanitary organization has not proceeded much beyond the first stage of organization of Local Boards of Health.

For the most part sanitary arrangements are individual to each premises. With the never absent outdoor privy-pit there is usually associated a wooden drain leading the slop waters from the kitchen, and this becoming choked creates the most dangerous of nuisances. But this evil grows in such places on their assuming the appearance and status of a town; dwellings are erected contiguously as stores along a main street and sheer necessity forces the construction of a wooden box drain to the nearest water-course. Here and there some hotel or bank building connects with this and by hand-pumped water to a tank attempts the supply of plumbing conveniences and causes extended pollution of a drain which cannot be properly flushed, and, even if it could, is not except in the most accidental way by rains falling irregularly. Such nuisances, we may fairly conclude, are being year by year more readily and thoroughly dealt with as Local Boards learn to recognize the powers and duties laid upon them and increase in a knowledge of the means by which such evils can be remedied. Illustrations of this class of nuisances may be found in correspondence from Niagara-on-the-Lake, Exeter, Cannington, Newmarket, Brownhill, Waterloo, Tottenham, Stratford, Seaforth, etc., and will be found referred to in the annual reports of these Boards.

To the end of removing this class of nuisances every effort must be made by officers of health, whether provincial or local, to educate Local Boards in the methods, which by the application of the principles involved in the "separate" system of sewerage makes the dealing with sewage in a scientific manner a possible thing for every hamlet, and even for every household. Reference was made fully, in the Report for 1888, to the sewage farm, now in successful operation at the London Asylum, whereby the sewage of a population of 1,000 persons is being most successfully dealt with.*

*The following note from Dr. C. N. Beemer, of the medical staff, in answer to a letter asking how the farm had done its work during the winter is of interest :—

MY DEAR BRUCE,—What do you mean by "during the cold weather?" we have had none this winter in this vicinity, and the test to which we expected the sewage farm to be subjected during the present winter season has not yet been applied. There has been no accumulation of sewage to speak of, though a few times the time for clearing off the ditches was about four days. Whenever a few inches of snow have fallen on the dry ditches, and subsequently the sewage has

In Col. Waring's work on "Sewerage and Land Drainage," just published, he states that "in a closely built street with occupied twenty-five foot dwelling houses on both sides of the way, and with cross streets 80 feet wide every 400 feet, a six-inch sewer having a fall of 1 to 200 will not run half full until it has reached a length of 3,600 feet, the sewage being equal to 60 gallons per day per head of population, one-half of which is discharged in eight hours." Now, according to data given by Waring compared with those in the report of Mr. Willis Chipman, C.E., regarding the cost of nine-inch sewers in Brockville, the cost of construction in a soil where no rock excavation is necessary of a six inch sewer, including flush-tanks, would be about \$5,000 per mile. This would mean, at 5 per cent. interest, \$250 per year. Can any, even the smallest village, any longer claim that there can be any reason for the maintenance of a nuisance in connection with house drainage. But when it is further realized that with the intelligent expenditure of a comparatively few dollars every house with a garden attached can dispose of the sewage from wash tubs and sinks and even from water closets and baths, when water is pumped either from cistern or well to a tank in the attic, the excuse for maintaining any longer deposits of refuse under or about a house becomes ridiculous. This can be done by a tank, best made of brick set in concrete, but where less expense is demanded two-inch plank tongued-and-grooved will serve every purpose. It is well that the tank have two compartments and that the sewage pass from No. 1 to No. 2 by a T pipe drawing off the sewage from below its surface to prevent grease passing over. In No. 2 compartment is placed a tumbling-basin which receives the liquid sewage and is at intervals emptied automatically. From this the sewage passes into a system of sub-surface field tile drains placed some twelve inches below the surface and having a capacity about equal to that of the tumbling tank. The sewage passing out into the soil is there subjected to the decomposing action carried on by the bacteria of the soil in the presence of the oxygen of the ground air, thereby becoming the food for the plants or grass growing over it. Such systems have worked uninterruptedly for seven years and then when examined the ground was found in no wise different from other garden mould.

The remarks made by the Medical Health Officer of Brantford on the subject of sewage disposal in his annual report well express the present position of this branch of sanitary work.

A class of nuisance which has been referred to in previous reports, and which, in some instances, becomes the occasion of serious effect upon the public health, is that of creeks running through towns, or having house drains and sewers running into them, and in other instances being further obstructed by mill-dams creating ponds, often of considerable extent, must here again be noticed.

been pumped upon them in a low temperature, the sewage would freeze and would not soak away till all had melted again. A good deal of the time the ditches did not afford sufficient accommodation for the sewage and it was allowed to flow over the open field, but it never reached the large ditch into which the tile drain empties. By the way there was so much rain that the ditch was so filled with water that the tile could not be seen—it was always submerged—and there was no way of determining whether water was escaping from it or not. A few times the liquid in the ditches between the beds has frozen so stiff that the attendant could walk upon it; after the liquid under the ice would soak away, the ice would break and fall in. Sorry I cannot give you any further information, but there is none to give. I myself believe the plan will succeed in a cold winter, but this, so far as we are concerned, is only an opinion.

Yours faithfully,

C. N. BEEMER.

As an illustration of this class of nuisance I cannot do better than introduce a brief report regarding the river Speed at Guelph, and the recommendations made regarding it.*

This is in the main a repetition of the nuisance in the river Thames at London, which for several years past has been a *questio vexata* to the courts, and which was reported upon very fully in the report of the Board for 1885. Added to this class are those such as that at Madoc on the Moira, at Chesterville on the Nation, at Caledonia on the Grand, at South River Station on the South River, at Parkhill, etc. Of all classes of nuisance this may be considered as the most difficult to deal with, involving as it does the question of notable losses to those industries dependent upon the water privilege for supplying power to their mills. Some of them are, however, being solved very satisfactorily. The Moira has been led back to its natural channel by the removal of Wall-bridge's dam, compensation therefor having been given. The Nation has been lowered by the removal of the dam at Chesterville, the object in this case being the lowering of the river level, thereby lessening the dangers of floods, as well as lowering the ground water in the flat country through which the river passes. The curious fact in this connection is that the villagers protested against the removal of the dam on the ground that the leaving bare of the considerable area of ground forming the pond above the dam would promote the development of malarial exhalations through the decomposition of the large amount of organic matter exposed. Doubtless the evil results would be temporary, since the gradual drying out this area, and the springing up of vegetation would utilize the products of vegetable decay; but in such cases the stirring of the soil and sowing oats, grass seeds, etc., will rapidly mitigate evils likely to result.

The dangers from sawdust pollutions in streams are yearly growing less in the older sections. The Ottawa is the most infamous in this respect, and to such proportions has the nuisance extended there that the Federal Government has instituted a special investigation into the matter. With the facilities, as at Deseronto, for transforming the sawdust into marketable materials there ought to be no excuse for the perpetuation of the evil. Along

*REPORT ON NUISANCE IN RIVER SPEED, GUELPH.

TO THOS. KEATING, M.D.,
Medical Health Officer, Guelph.

DEAR SIR,—In response to the request that I should state my views with regard to the nuisance situated along the River Speed which, in acting on a telegram from your Board, I, as executive officer of this Board, investigated in conjunction with your Board on the 12th of October, 1889, I herewith desire to submit the following report for the consideration of your Board and the city council.

The conditions found were substantially as follows:

1st. A sluggish stream where the river-water is held up by Spence's dam, even when the water is being used, and a stagnant pond extending for half a mile when the water is stored above Goldie's dam.

2nd. When the water has been drawn off, as at the time of my visit, at Spence's dam, or after it has been used as a water-power during the night, there is found existing not only a sluggish or stagnant water but further a large area of organic deposit on the exposed banks, extending for say twenty-five feet on both sides of the river for a distance of about half a mile, or in other words an area of almost four acres. This means that so long as this is the condition of the river, say from May till the frost sets in in November, a mass of organic matter of this area undergoes in varying degree, according to temperature, putrefactive decay.

3rd. Not only has this organic matter the qualities common to vegetable deposits which take place on the bottom and on the banks of all ponds, as also in the shallow water along the shores of rapid streams, and which, when exposed to the summer sun, have never failed to be productive of malaria; but it further possesses those more malign elements tending to produce such maladies as typhoid, remittent fever and diphtheria, due to the presence in it of the sewage from a very considerable number of private and public dwellings and soakage from manure heaps and privy pits, as well as the bodies of dead animals and offal, which from time to time are deposited in it.

4th. To be more explicit with regard to the essential nature of the nuisance, it is sufficient to say that it is a biological law now generally admitted by scientists that given organic matter with moisture in the presence of a temperature of say 50° to 60° F. and upwards, and exposed to contamination by bacteria, always present in ordinary air, putrefactive decomposition of the organic matter will go on, bacteria will multiply in infinite numbers, producing at the same time nauseating and unwholesome exhalations. These emanations, as gases, pass into the air whenever these surfaces are exposed, as also in less degree from the surface of the water; while the bacteria are borne along by the winds wherever these moist surfaces have become for even a few hours dried out.

5th. Emanations from nuisances of any sort are borne into the upper air, during the day ascensions currents due to the heated soil warming the air next to it; but towards and after sunset the cooling ground

the lakes and rivers of the Parry Sound, and other northern districts, the decay of large accumulations of sawdust, which pollute the water supply and contaminate the air of cellars and the spaces under houses has, for several years past, become a serious evil. The control of these settlements by the large lumber companies makes municipal action directed towards remedying them a tedious and most unsatisfactory process. The Board may very properly extend investigation in this direction. A marked illustration of the dangers from this class of nuisances was incidental to the floods which in June last prevailed at the time when the Johnstown calamity occurred. The Sydenham, which is dammed at Wallaceburg, became completely jammed to a depth of fifteen feet with the logs from broken booms up stream. The presence of carcasses of animals and other refuse demanded, in view of the approaching dry and hot season, active measures for the removal of the debris. The absence of a current in the river made this process tedious and somewhat expensive, but the Local Board and council of the town proved equal to the emergency, and danger therefrom was averted.

2. Ground Waters.—The extent to which the physical and material interests of our people depend upon abundant supplies of pure water, supplied in even small villages in a public way for fire purposes, has led me to again direct special attention to a subject which was dealt with somewhat fully in the report for 1887.

The activity which the Local Boards of Health, in many places, are showing in solving this difficulty for the people they represent is another strong reason why they should be supplied with as many facts touching upon this matter as our Board is in a position to supply. I have, therefore, endeavored to again indicate briefly the physical characters of and the phenomena associated with ground waters, and thereafter to discuss some of the biological features and practical points which attach to its use for drinking purposes.

causes an opposite condition, and these exhalations and bacteria are kept in the chill, moister currents of the atmosphere near the earth and affect often most disastrously persons abroad at night and those living in houses within the influence of these contaminated air currents.

6th. I presume that were it necessary your Board could readily produce abundant evidence that the general laws set forth in the two preceding paragraphs have not failed to develop, especially in the neighborhood of the River Speed, those unsanitary conditions which elsewhere are known to be in greater or less degree always present. The existence of a nuisance being therefore assumed as proved, the possibility of measures being taken either to lessen or to wholly prevent the recurrence must be considered, and in this connection I would say :

7th. That the absence of organic deposits from even stagnant water, or along its shores, were such a thing possible, would mean the absence of a nuisance of this nature ; but the absence of organic deposits from running water or from along its shores would still more certainly mean the absence of a nuisance of that nature assumed as existing here. We may further say that even were organic matter to some degree present in the water and not exposed on the shores of a flowing stream, no nuisance of this character would arise in case the water polluted were not used as drinking water.

8th. We may thus prevent the existence of such a nuisance by either of two ways : (a) Remove all organic matter from the exposed surfaces now existing, and prevent its deposit there in the future ; or (b) cause the whole area to be constantly covered with water always flowing, or, since this does not seem possible, confine the volume of water as it at present exists within a channel sufficiently narrow and deep to prevent any exposure of its banks and the maintenance of a constant current of flowing water. With this provision for either removing the existing pollution of the uncovered banks must be had, or the aeration of the soil, as by cultivation, with the growing of some rapidly developing green crop, becomes an essential to the prevention of temporary evil resulting from the further decomposition of this organic matter.

9th. Should the method (a) be adopted, it would mean a great expense to either remove or cover over with clean gravel the four acres of organic matter now exposed, while I am not aware of any means which would prevent a recurrence of the pollution by vegetable matter, even though the sewage were completely prevented from flowing into the stream. Similarly, under existing circumstances, it would seem impossible to keep the area as at present existing along the shores from being exposed, unless provision can be made by which Goldie's and Spence's water-power be used at the same time, and that this be throughout the twenty-four hours, the volume of water being thereby at all times much the same. The limited quantity of water, however, makes this out of the question.

10th. There would seem then but one method of dealing with the problem, viz. : to allow no pond above Spence's dam, and to cause the cutting of a narrow, straight channel of sufficient depth to keep the stream flowing from Goldie's dam within its limits, unless during flood time. The water-power might at the same time be continued by carrying the water from Goldie's flume in a pipe to Spence's dam for power purposes if used at the same time.

These methods are those which present themselves to me as being a solution of the difficulty as far as Mr. Spence is concerned. I do not propose to enter into the legal question of jurisdiction ; suffice it to say

a. **The Sources of Ground Waters.**—We are aware that precipitation on land and sea of the moisture of the clouds is the method by which the water, borne into the air by evaporation, is returned to the earth. The yearly amount of rain which falls in Ontario is commonly more than 30 inches; but the amount of this that becomes ground water, that is subsoil or subterranean water, is, owing to its rapid flow from the soil where it falls to the water-courses, and to evaporation, probably not less than half the total amount. That this amount which reaches the creeks and rivers is not wholly lost, but to some degree becomes a source of supply to subterranean waters, we shall, I trust, later on produce facts to show.

To refer to the ground waters of Ontario more particularly, let us recall the geological characters of the strata in which these waters are found. The Laurentian band of gneissoid rock runs in a north-westerly direction, with its western edge in the neighborhood of Kingston, thence running to the south of Muskoka lake, thereafter going to form with the Huronian series, the islands of the Georgian Bay. Overlying this, and varying in extent and thickness, we have limestones, slates and sandstones, and limestones again succeeding each other until the Detroit river is reached. These have a general westerly dip or incline, varied, however, by escarpments, anticlinals and synclinals, probably to a much greater extent than at present we have any idea of. Thus the Guelph limestone is about 900 feet above the sea, the Niagara escarpment reaching in some places nearly 700 feet, while along the Detroit river and Lake Erie the rock level does not exceed, if it reaches, 600 feet, descending again from this at the level of Lake Ontario to but little more than 200 feet above the sea level. Overlying these rock surfaces of varying elevation, we have deposited in widely extended areas along the lower Lake Huron and Detroit river district, the whole of the Lake Erie shore, and a large portion of the Lake Ontario shore far east beyond Toronto, the boulder or Erie blue clay, overlaid in differing degrees of regularity and thickness by Saugeen clays, everywhere interspersed with bands of sands and gravels. On the higher levels, as of the Guelph plateau and the Oak Ridges, we have deposits of varying consistency from the tenacious argillaceous gravels of the central plateau, as at Guelph, to the arenaceous gravels of portions of the Oak Ridges and the stony and sandy soils of the lands dipping towards Georgian Bay.

that there seems to be no doubt that the owner of Spence's dam, having the water privilege by which the nuisance is caused, becomes under Sec. 60 of the Public Health Act responsible therefor. This being the case, the Local Board, by Secs. 56-60 of the same Act, is called upon in the performance of its functions to order the abatement of the nuisance within a specified time. While not called upon by law to suggest a remedy, the Board may, should it deem it proper, advise:

(a) The removal of the dam, leaving the onus of removing the putrescent matter and straightening the bed of the stream on the Local Board or council, the latter to charge the cost (if thought advisable) against all persons known to have been agents of such pollution.

(b) The maintenance of the water power by conducting the water to the wheel by a pipe and leaving the whole river bed and dam to be dealt with by the Local Board and council.

(c) Other measures might be suggested, such as erecting stone walls for some distance up the stream above the dam along either bank and deepening the bed at this point, at the same time giving it a level bottom, but they would seem to be both expensive and uncertain in the result, as by damming up the water so that it would again overflow the flat only to be uncovered again when the waters have fallen during the running of the mill. The action under existing conditions which will be found necessary, even though the dam be removed, is the prompt prevention by the Board of the pollution of the stream which now goes on from cesspools, stables and privies within the town, the cleansing of the river bed and the straightening of the course, making it narrow and deeper. While this is being done a sewer pipe might be laid in the bed of the river (as part of a well-planned system of separate sewerage, by which the sewage from the houses throughout this drainage district might be conducted to a point below the town to be treated by utilisation on a sewage farm or by precipitation) and so prevent the pollution of the river while giving the town the benefit of sewerage for its most crowded portion.

Should the Local Board, after deciding on the action to be taken, deem an enquiry necessary, it will be proper for it to make application for such under Sec. 64 of the Public Health Act.

Hoping this statement may appear to be a satisfactory explanation of the nature of the difficulties before your Board, and of the steps to be taken for their removal,

I have the honor to be, with regard,
Your obedient servant,

PETER H. BRYCE,
Secretary.

In addition, however, to these broad divergencies in the post-glacial deposits overlying the rock strata, we have the innumerable local differences, nowhere better marked than about Toronto, depending upon the denuding agencies which have hollowed out the whole Lake Ontario basin and produced the valleys of denudation such as the Humber and Don valleys, and the many smaller ravines distinctive of the sharp-cut outlines which deep erosion of these blue clays everywhere presents.

From this *resumé* it will at once appear to all that an endless variation in the conditions regulating the direction, depth and amount of the flow of ground waters must exist, and we have two problems everywhere presenting themselves for investigation, the geological and the topographical. Let me give one or two illustrations.

The little river Avon, beginning on the high ground eastward from Stratford at a probable height of 900 feet or more, takes a general south-westerly course, flowing into the east branch of the Thames, which receives a similar stream at London, and passing westward through Chatham empties into Lake St. Clair some 600 feet above the sea. There are abundant outcrops of rock along the Thames at St. Marys and elsewhere in the vicinity, while at Chatham it is reached by borings at from 40 to 80 feet below the surface alluvium. Apart from the synclinal or depressed area which practically forms the oil-bearing region of Ontario, there is the general incline of strata from the central plateau south-westerly. At Woodstock, at St. Mary's, at London, at Thamesville, at Chatham, and indeed all along the westerly part of this region, there is evidence of the enormous body of water flowing from the higher ground to the east and north in the presence of artesian or flowing wells in greater or less degree, according to the accidental height of the soil as compared with the general level of the locality.

On the other hand, as an evidence of topographical influences, we have the fact that along the ridge of gravel which runs for many miles east and west along Lake Erie, at times touching the lake, at others being several miles away and broad enough to have located upon it such towns as Ridgetown, Blenheim, etc., numerous springs may be seen issuing from either slope, in places only a hundred or so yards apart, those to the south flowing into the lake, the others trending towards the valley of the Thames ten miles away. To give but one other illustration, a gentleman who resided at Norway (near Toronto) for some years, informed me that an old well had been sunk in the sandy soil on his grounds, some fifteen feet, and gave a fair supply of water. Its location being inconvenient to the house he had another well sunk nearer, and within one hundred yards of the other well, and he had to go down some sixty feet in blue clay before what was probably the same bed of sand was reached, it yielding abundant water.

We have already referred to the source of subterranean waters as being due to the rain falling upon the soil, and to the fact that a large portion of the rainfall finds its way to the water-courses without being absorbed by the soil. The balance, however, probably amounting to about 50 per cent. of the total rain-fall, is absorbed, but in very unequal amounts. The amount of absorption, as will be readily be understood, will depend upon, first, the inclination of the surface soil, and second, on its pervious or absorbent character. Setting the first aside as unavoidable, we have to realise that the surface soil of Ontario, with deforesting and cultivation, has lost in large measure the virgin mould made up of decaying vegetable matter which, loose in its character, absorbs in large degree all the rain which falls upon it. This not only gives the underlying soil every opportunity of absorbing all the moisture it can hold, but it also maintains it in a friable condition very different from the hard-baked surface which anyone may notice even in sandy soils which are exposed to the heat of the sun. Accepting, however, existing conditions, it will be seen that notable differences exist between the absorptive powers of argillaceous and arenaceous soils and the various gradations between them. We must here note a difference of much importance in its bearing on this matter, viz., that between the capacity of a soil to hold water or its absorptive power, and its perviousness.

For instance, Prof. Schubler, of Tübingen, states as the result of experiment that

| | | |
|-----------------------------------------|----|---------------------------|
| Sand holds by attraction per 100 parts, | 25 | parts by weight of water. |
| Loamy soil, | 40 | " |
| Clay loam, | 30 | " |
| Pure clay, | 75 | " |

Thus we see that perviousness is the opposite of capacity to hold moisture or retentiveness, as the most impervious soils have the greatest power to hold moisture within their interstices. The fact in drainage is a familiar one that where a clay has been puddled—for instance, where the heavily loaded waggon passes over a road—the clay particles become so closely pressed together that it becomes impervious until moisture and the frost have disintegrated it again. Deep clay soils may similarly become through pressure in a large degree impervious.

Now, we have already seen how, in different portions of the Province the superficial drift deposits lying upon the rock vary notably in character, and how the layers which succeed each other may alter in some instances within a few feet. These variations have depended, of course, upon the conditions which existed at the time of their deposition. Remembering that from the melting glaciers and icebergs of the post-glacial eras the detritus would follow the order which we can observe after a storm in any stream, we would expect to find what we do find; that the heavier boulders, gravels and sands would settle first along shores and in the shallow waters, and that the argillaceous materials remaining longer in suspension would last be deposited in the outer and deeper waters. Currents, variations in the outlines of the shore, and all the other phenomena seen daily in lake or stream, must be looked to for the explanation of the local variations; to which we must add the denudations and innumerable rearrangements due to the floods of primeval mighty rivers, and the varying levels which have given us our system of lakes of varying heights.

The arrangement and order of the post-glacial materials has an interesting and very practical bearing upon the volume and direction of ground waters in this Province. To refer once more to the illustration given, we find the general character of the soils over Waterloo and Perth to be calcareous sands and gravels. Where these lie upon the rock we can see that there will be water-bearing strata of pervious layers, which may be continuous for many miles and thus supply a *vis a tergo* pressure of enormous power. This will, however, depend upon the character of the superjacent layers. If pervious, the water will on account of this pressure tend to rise to the surface. If, on the other hand, tenacious clays overlies these pervious layers, as is the case over a large portion of the Province, then these waters will rise to the surface wherever denudation and erosions, as in the case of river valleys, are present, or where borings or dug-wells passing down through impervious beds make a channel by which the tendency of the water to rise to the level of the head which it has can come into play. That this rise of waters in driven wells will take place, depends, however, upon whether there is any hindrance to such underground streams following further in such pervious strata along the incline or dip which we have already supposed to exist in the underlying rock strata.

In other words, the occurrence of an artesian well depends upon the following conditions, as well expressed by Prof. Laveratt, who has examined largely into the question of public water supplies in the western prairie states; (1) A pervious water-bearing stratum; (2) An impervious stratum below; (3) A second impervious stratum above the water-bearing stratum; (4) These strata must be inclined or have a dip; (5) There must be no adequate outlet for the water at a lower level than where the boring is made; (6) A sufficient collecting area or reservoir with superficial porous strata; (7) The collecting area must have sufficient elevation to act as a fountain-head; (8) There must be a continuity of the permeable bed; (9) There must be no flaw or break in either of the confining beds. Chamberlain has given the dip necessary as being at least one foot per mile. From these several conditions it becomes apparent that though one or several of them may be present, yet the conjunction of all of them is not by any means to be expected in all parts of the

Province, although the numerous borings being made, especially in the western portion of the Province, for water, salt, oil or gas give evidence that such supplies of water are much more numerous than we at first might expect.

The details which we have just given are applicable in explaining the source, extent and progression of ground waters on the broad scale. The most cursory examination, however, of the upper soils of many districts in the Province shows that the great proportion of ordinary well water is as yet got from comparatively shallow wells, there being present in most districts alternating local pervious and impervious strata, making wells yielding water possible within fifteen to fifty feet of the surface. In other parts, as in many portions of the western peninsula, shallow excavations through alluvium down to impervious clays becoming reservoirs for surface waters, have till very recently supplied the great bulk of drinking water both in towns and country districts. Now in every instance the same laws are in force, and we have seen that they involve: (1) A downward force of gravity; (2) A hindrance such as an impervious stratum; (3) A lateral movement of ground-water towards the lowest attainable point, whether this result in great subterranean water-beds on the rock strata, supplying conditions for artesian wells; whether in the appearance on the hill sides of gurgling springs and a saturated surface soil in the vicinity, or whether in the soakage into the nearest depression, as wells, cellars or other shallow excavations of waters,—all following the general law of downward and lateral movement where obstructions do not prevent.

In view of the great extent to which the search for and successful utilization of underground waters for public water supplies has gone on, it will be of interest to refer to some of the facts relating to the physical phenomena belonging to them.

As regards the flow of these underground streams, it may be said that their passage through the minute interstices of a permeable soil is similar to that through an infinite series of small tubes or irregular channels. Experiments carried out by Darcy of Dijon, and established by Dupont, have caused laws to be enunciated governing this flow. Thus speaking of these interstices of the soil as of a tube, it may be stated that *the flow will increase with the effective charge (i. e. volume) and diminish with the thickness of the layers traversed which lengthens out the conduit and augments the friction against the walls, and having, as a result, a loss of flow.*

The rapidity of flow as well as quantity will, as already mentioned, be variable, according to the character of the soil.

Thus the interspaces in different materials as given by Durand Claye cause a loss of flow as follows:

| | | | |
|------------------------------------------------|-------|----------|----------------|
| Through Broken stone..... | 45°/o | to 50°/o | of the volume. |
| “ Chalk | 32°/o | to 42°/o | “ |
| “ Gravels of the Seine..... | 43°/o | | “ |
| “ Various gravels..... | 36°/o | to 40°/o | “ |
| “ Recent alluvium of Seine..... | 30°/o | | “ |
| “ Ancient alluvium of Seine..... | 16°/o | | “ |
| “ Fine siliceous sand from pulverized gneiss.. | 17°/o | | “ |

The slight dip of strata becomes, as already mentioned, another most important factor regulating the rapidity of flow.

Properly speaking impermeable beds have no true water-zone; superficial springs may be formed and superficial infiltrations may take place in soil with a covering of vegetation or if well cultivated, and these filtrations produce springs or rather ooziings, collecting into a reservoir, in places a little more permeable, of the first minute and discontinuous streams. Thus pits or wells dug result in obtaining only weepings or feeble streams, these wells being popularly called *weepers*.

To illustrate these facts the following instance may be given: A property north of Toronto, and contiguous to the city, had for many years the reputation of having a poor supply of water and some five wells had been sunk within an area of two acres in search of

water. In an old stone well some 35 feet deep there appeared to be, after the fall rains had set in, an abundance of water, it making some 15 feet of depth. Doubtful of the statements, I had the well pumped out, and to my surprise, during a period of temporary cessation from rains, the well remained practically empty.

After subsequent rains, and at the opening of spring, the well has remained full almost to the top. In order to solve the problem of a water supply a boring was made in the stoned well, and fifteen more feet proved to be of a most tenacious clay. The explanation of these phenomena was thus obtained. Determined to obtain water a new adit was made. The pit was pushed down foot after foot into blue clay of the densest hardpan. At 59 feet a change occurred, a dry layer of hard sand was struck and at two more feet the water-zone of quicksand was reached. Excavation became difficult, owing to the rapidity with which the water flowed in until its own level was reached. By careful and tedious work a permanent depth of five feet of water was obtained above a lower impervious layer.

The piercing of the clay solved the problem. This pit has not filled up in the same way as the other wells, an outlet existing for the water at the bottom; while the pits in the clay aptly illustrate the statements made by M. Durand Claye that the simple infiltration into these largely impermeable beds gives rise to (*des suintements*) oozings or slow soakages rather than to springs.

In another well sunk in the clay beds north of the city, in a district with a reputation of having similarly a poor water supply, a well five feet in diameter sunk some sixty feet supplies daily some two thousand gallons, and after steady pumping of this amount by wind-mill has filled the water tanks, a few hours finds the water at its own level in the well.

In both instances the general direction of the dip of the strata is from the Oak Ridges in the north toward the south, while the erosion of these strata, as seen at the Davenport ridge, readily supplies an explanation of how when water is reached beneath these superficial clay beds, no notable artesian tendency is seen at this point; but at a point just north of High Park nearer the lake where the Davenport erosion to the north is much less marked, and on the property of Mayor St. Leger, of West Toronto Junction, in a boring of six inches diameter with a depth of 189 feet, the water has risen to within 40 feet of the surface. The boring was through a bed of sand and some gravel. The water is not as yet of good quality.

The explanation of this phenomenon is probably due to there being an insufficient outlet toward the south, there having been an old valley of denudation in the blue clay, which has subsequently been filled up by the water bearing sand and gravel stratum.

On a larger scale and with the view of determining a problem, of vast importance and value to the Province, the water works company of Chatham have made a series of borings there and have illustrated some important facts.

The following is the character of the strata passed through, which may be taken as a type of the rest:

| | |
|-----------------------|----------|
| Dark loam | 1½ feet. |
| Yellow loam | 3½ " |
| Red clay | 4 " |
| Blue clay | 17 " |
| Hardpan | 26 " |
| Soap stone | 9 " |
| Sand | 2¾ " |
| Gravel | ¼ " |
| Total thickness | 64 " |

The various borings have developed the fact which might have fairly been inferred that the Hamilton shales (so called) which underlie the district have but a slight incline or dip at this point. Assuming the continuity of these strata eastward and north-easterly,

rising somewhat with progress upward under the Thames valley ; noting the further fact that under Thamesville water is met with at a moderate depth, and that there is a gradual rise of the underlying rock strata which appear at the surface along the river bank at St. Mary's, in Hibbert Township; etc., we have every ground for assuming that in this distance from the water-shed to Chatham, a distance of 150 miles, with a total dip of 400 feet, or nearly three feet to every mile, there is a water pressure sufficient to give a rise of some 40 feet, the law governing flow as given in the preceding section having been followed. The further fact has been made apparent that in those localities where the water zone or water-bearing stratum, as in the case given, is say 3 feet in thickness, the amount of water rising in a 10 inch boring is sufficient to yield without any exhaustion over 10,000 gallons in 24 hours. Under such conditions there will be but little difficulty in establishing by an application of the laws of Dupont and Durand Claye an approximate estimate of the area which may be looked upon as necessary for supplying sufficient water from a given number of wells, and the distance at which they may approximate without seriously affecting the flow of one another. The same law governs here as elsewhere. "The flow is proportionate to the body of water, the thickness of the filtering layer (water zone) and to its coefficient of permeability."—Claye. Friction in a single tube as in a bored well, has but a slight relative influence. To illustrate, Durand Claye, states that in the Grenelle artesian well with a diameter of 0^m.75 (over $\frac{3}{4}$ of a yard) the loss of the charge by friction in the ascensional tube is one metre, 39 inches (in 510 metres) of height, while the loss due to filtration (that is the passage through the permeable layer below) is 56 metres.

It is for a moment difficult to conceive how a few borings into a water-zone can supply sufficient water for even a small town ; but where under the operation of the foregoing laws, it is remembered that a water-zone similar in thickness to the one in the boring at Chatham, *i.e.*, three feet and of a mile square of area, contains 585,446,400 gallons, we may gain some adequate idea of what exhaustless stores of water exist lying buried beneath us. When it is further recollected that on an average 50 per cent. of the annual rainfall (*i.e.* 15 inches) is absorbed by the soil, we see how for broad areas the supply is inexhaustible. To give a practical illustration it may be pointed out that I witnessed at the water station of Brooklyn, N. Y., some 125 two-inch pipes placed around the outer border of an excavation about one-eighth of an acre in extent, intended as the basement for a new building for the water station, yielding a flow of water drawn from this area amounting to between five and six million gallons daily. That similarly ample supplies can be got from a limited area is illustrated by the fact that the Town of Goderich obtains from six artesian wells, within an area of a quarter of an acre, enough to supply the daily needs of the population; and Kincardine is now pushing to completion a system of works whereby the town may if it choose be similarly supplied by water from an artesian source.

In view of the drying up of the small streams which as natural channels are commonly in the neighborhood of most of our inland towns and villages, but which with the cutting of the forest have grown less and less year by year and proportionately more polluted, the facts which have been just set forth cannot but fail to appeal to Local Boards of health in all parts of the country, as in their annual reports, found in the Appendix, there is an almost universal testimony as to the dangers, illustrated by cases of typhoid and diphtheria which have actually occurred, of the pollution of pit-wells and an almost equally unanimous demand in progressive towns and villages for a supply of public water of assured quality.

We have now reached the second and more important part of our subject, and the work to which I have more especially devoted my studies, *viz.* : the constitution of ground-waters.

b. Constitution of Ground Waters.—In addition to the chemical combination of hydrogen and oxygen making pure water, we are aware that a large number of other chemical compounds are held in solution by it, and that in its passage through the soil it dissolves out such soluble matters as it comes in contact with. We may hence speak of the chemical constituents of ground waters as impurities, although, as we know, they owe to the mineral salts in solution their agreeable and wholesome qualities. These impuri-

ties, with minute amounts of organic matter, which from their occurrence independently of all adventitious influences may be called obligatory in contra-distinction to the facultative or inconstant impurities which depend upon influences which may be removed, I do not propose to refer to further here, but shall limit our study to the facultative impurities of an organic character.

Every one is aware that water will carry in suspension, as in rivers, ponds, etc., very large amounts of organic materials, and that from these, whether animal or vegetable, it abstracts soluble matters, remaining present until decomposed into simpler constituents. To give but one illustration, the city of St. Louis, Mo., has four settling basins, holding 18,000,000 gallons of water. Their floors are paved with brick, and upon these are deposited by sedimentation the suspended, and to some extent the dissolved materials of the river water. Once in five months the sediment is flooded out of the reservoirs, and the quantity thus removed is nearly 200,000 cubic yards, of course largely inorganic matters. This is when the needs of the city only allow sedimentation to go from eight to eighteen hours, while clayey matters in suspension often take a week to subside. The sources of these impurities are those common to all river waters, being the vegetable matters borne in from streams and riyulets rising on the upper gathering grounds of the river, bearing with them the soluble matters from the bogs and virgin soils whence these springs rise, as well as the sewage deposits which may be poured in from towns along the river banks. From such causes are due the fact that river waters are considered commonly unsafe sources for public water supplies. They are not only readily contaminated, often to an extraordinary extent, but the swiftness of their waters bears these impurities onward before the purifying influences in the waters have time to perform their work, and hence sedimentation reservoirs and filtration beds have been brought into requisition in the endeavor to bring the water into a potable condition. We see in these operations going on before our eyes with river waters, an illustration of what takes place with ground waters, only that the stages of the different operations are in the latter more slowly and much more perfectly performed. The rains which fall on the surface and are absorbed by the ground bear to it minute amounts of carbonic acid and ammonia, which have, as gases, been borne into the air, due to organic combustion and decomposition. These gaseous impurities of the air, which had their origin in the earth, become of much value in aiding in the chemical disintegration of the soil, and thus help the percolation of water through its layers. The rains, however, receive from the upper layers of soil, which always contain organic matter either of vegetable or animal origin, soluble materials such as the above, soluble albumen, and other products of humus, etc., and moreover, in addition to what may have been borne to earth with the rain, living organisms of various species, notably that of the bacteria, as is now well determined, are the agents of decomposition of organic compounds of every sort, and are present in infinite numbers in surface soils.

It has been already said that carbonic acid and ammonia are the two principal soluble compounds resulting from decomposition of the organic matters of soils. Now, we find, especially wherever albuminoid materials are present, the multiplication therein of bacteria, whether in the soil or in the substance of an artificial culture, that these two gases are amongst the principal products. Subsequent chemical action, as by oxygen, forms carbonates, whilst nitrates develop out of the ammonia present. Manifestly, however, the effect of the oxidising processes will depend upon the depth of the organic materials and the porosity of the soil as regards the movement of gases in the soil and the depth to which the bacteria of the soil are found to extend. Now, while the two first conditions are interdependent and conditional in some measure upon the depth at which bacteria will be found, yet, as will be seen, there are several other factors in the problem which must be considered.

Duclaux has stated that of the agencies which render water sterile in its passage through the soil, "the first, the oldest known, and without doubt the most potent is the capillary action of the soil. Filtration practically retains in the capillary pores the materials in suspension in the water, and with them the germs of microbes. It is a fact clearly demonstrated, on which I shall only insist in order to attempt to indicate slightly what one calls capillary filtration." . . . "It is proper to mention at the outset that the

capillary character of the channels in which circulates the water of rain has only the effect of augmenting the action of the surfaces on the volume of water which leaves them, that is to say, of multiplying the chances which a solid particle in suspension in water can have of encountering a portion of wall on which it fixes itself, drawn by a force analagous to that which fixes coloring matter in a tissue placed in a coloring bath. The effect would be the same if the chances of contact were found increased by any other cause. . . It could happen, and sometimes does happen, moreover, that a long repose causes to adhere to the walls of a vase the particles held in suspension in the liquid which it contains. It can happen, and without doubt does happen, that a slow filtration through a great length of spaces non-capillary and even somewhat large, produces the same result as through capillary spaces shorter and narrower.

We thus see that at the rate at which water passes downward through the soil, which as Hoffman found at Leipsic in some virgin soil was at the rate of 6.2 millimetres daily, or two metres annually, and which, as Duclaux remarks of ground waters, may remain six months or more as subterranean water before appearing at the surface in springs, ample opportunity for sterilisation by filtration is given. An exception to this sterilisation of deep waters may be seen in calcareous soils, in which the action of carbonic acid on the chalk has by solution caused fissures, often to great depths. They may bear contaminated waters very long distances. The conditions which regulate filtration in soils are, as Pettenkoffer says, so sufficiently constant that general laws may be made regarding them. He remarks that the volume of the pores does not vary much in various soils, and may be considered to occupy the third of the whole. The dimensions of each pore vary considerably in different soils. In soils which contain large pores the water penetrates rapidly; a compact soil, in which the pores are very fine is essentially hygrometric.

Subterranean waters may hence be uninfluenced by the heaviest rainfalls, if the water stratum be deep and separated from the surface by layers which may retain the heaviest rainfalls without allowing a drop to pass through. It is apparent, therefore, that with allowances for different kinds of soils we have roughly different areas, or, as Hoffman calls them, different zones, viz., the upper or evaporating zone, which may even hold the rain-fall of a whole year, and becomes the receptacle of all kinds of organic impurities, the culture medium for germs of every sort. Hygienically, this is of all the most interesting and important. The second, or intermediary zone, always humid, reached at varying depth, may give passage to waters very slowly, and only gives passage to the surplus over saturation derived from the upper layers. While generally speaking this area is beyond the influence of surface operations, yet it will readily be seen that in the degree that the superficial layer becomes, by the leaf mould of forests, drainage and cultivation, more pervious, the greater the amount of water that is absorbed, and the more readily will the underlying zones be influenced from it. Drainage and the cultivation of grasses, now that the forest areas have disappeared, are essential to the conservation of the level of ground-waters, since through their agency perviousness of soil is maintained, and the retention of pluvial waters where they fall is made possible.

The third zone in compact soils is only a few inches thick, increasing in depth where upper soils are more pervious. This is the supersaturated layer, along and through which flows the underground stream. The depth of this stream or the thickness of this zone is slowly or rapidly influenced according to the compact or porous character of the upper soils, the extent of the watershed above any given point, and the inclination or dip of the more or less impervious stratum or hard-pan along which this underground stream flows as also its depth beneath the surface. The illustration already given in the instance of the London West flood demonstrates this, while on the other hand the greater hygroscopy and retentiveness of clays with their closer texture, as already shown, will prevent surface influences readily showing themselves.

The remaining cause influencing these subterranean streams is that already referred to as existing here and there in those instances where the surface stream, as some river or lake, has water in the same level as the subterranean waters. The rise and fall of these surface waters caused by heavy downfalls of rain, and by winds raising or lowering the level at different parts along a lake, *e.g.*, Owen Sound, Goderich, Lake St. Clair,

Moulton township, etc., shows how the ordinary conditions governing these underground streams may have local extraordinary influences contravening the general law.

Returning to the consideration of the conditions which govern the existence and multiplication of microbes in the soil, we have to recollect the inconceivable richness of the superficial layers of organic matter in microbes. Two millions to a centigramme of soil as Duclaux gives it, but imperfectly conveys any idea of their number. Take the instance where in heavy clay soil the autumn and spring rains have saturated it almost to the surface. Here the small amount of air in the upper soil prevents oxidation in large measure of the organic matters. This lack of oxygen impeding the multiplication of bacteria is notably aided by the low temperature of this soil induced by evaporation. Parkes indeed found a difference of 12° Fahr. in the temperature of the upper layers of two contiguous pieces of bog land, one of which was drained while the other was not. Now, when the ground-water falls, the air follows, and with moisture and warmth nitrification goes on. But this favorable condition may be temporary. The heat of summer rapidly bakes such surfaces, air does not penetrate to the deeper layers, and moisture being deficient the multiplication of bacteria is again limited. Clearly, however, the recession of ground-waters from the surface with increasing temperature, as after the spring rains, means an increase in depth of the area to which nitrification extends—in other words the depth at which bacterial infection of the soil is present. In fairly pervious soils the roots of species of the clover and pea family have been found ten feet below the surface, while the roots of trees following the area of perviousness and nitrification, run laterally, spreading out to tile drains, and to a depth of twenty feet or more. As Duclaux remarks, the extension of germs downward in the soil ought theoretically to take place by a gradual extension, by increase from point to point by gradual growth, invading the deeper layers, and carrying life into regions which we know remain sterile. He then asks, why this sterility? Fraenkel has pointed out that the temperature at two or three metres below the surface is an absolute obstacle to the multiplication of the bacilli of typhoid and cholera, yet inasmuch as microbes may through cultivation acquire an ability to grow at lower temperatures than those normal for them, Duclaux affirms that the low temperature is not sufficient to explain the phenomenon. Further the absence of nourishment cannot be mooted as a sufficient explanation, since microbes can live and even multiply in distilled water, living, as Pasteur says, on their own tissues. A most powerful cause here exists in the absence of oxygen, which is more rare the deeper we go into the soil. Instead of oxygen, we find in such layers carbonic acid relatively in excess, and Léone of Munich, of Pettenkofer's laboratory, has by experiment found that Munich water, which at the place of origin contained 115 microbes per centimetre contained 10,500 in 48 hours and 500,000 after five days. At the end, however, of another five days, he found that in this water, in which the carbonic acid due to decomposition had so greatly increased, the number of microbes had fallen to 87 per centimetre. That this gas has a specific influence in preventing the increase of microbes was proven from the fact that if replaced by a current of hydrogen there occurred a rapid increase in the number of microbes.

As to whether or not, however, anaerobes or microbes which multiply in the absence of oxygen, can multiply in these deeper layers, experiment is as yet lacking on the subject. Certain it is that these waters flowing in the tertiary zone or stratum of supersaturation with a slow and uniform movement depending upon their depth, the weight of water and dip of the underlying impervious bed, end by arriving at the surface as springs, or in wells (either dug or driven) in a sterile condition. Arrived here, the water comes in contact with air, sometimes with light, also with infected soils as of the mould of the surface or the organic matter which finds its way into wells, and the conditions of sterility having disappeared, it becomes again inoculated with microbes.

As may be readily understood, the further from such underground conditions a water proceeds the greater are the possibilities of its inoculation and of the variety as well as the number of the microbes in it. As natural waters in different regions vary in temperature and in the amounts and character of the organic and mineral constituents in them,

it is only natural that different species of these microscopic plants should be characteristic of different waters. Winogradsky has studied the species in sulphur waters, while Fazio and others have found species peculiar to the waters of Naples, Castellomare, etc.

How extended are these differences of species, and what the peculiar influences favourable to each are, has not yet been investigated. Indeed, it may be said that this study of species is little more than begun. When classification has become possible the still more difficult matter of deciding which are pathogenic and which are innocuous will remain.

With a view to determining under what circumstances these sterile underground waters can be obtained for drinking purposes, work has recently been carried on by Carl Fraenkel, of Berlin, and some interesting results have been published. I shall take the liberty of introducing here a condensed abstract of his experiments, as they are found to be wholly in accord with the views which reasoning based upon the known facts would lead us theoretically to believe.

Fraenkel's investigations were undertaken to determine if it were at all possible to remove with complete success infective material which had once got into a well.

He notes the two forms of wells, so-called kettle wells (*kessel brunnen*) from which the water is obtained by bucket or pump, and the driven wells (*robren brunnen*.) These two forms are exposed to different methods of infection.

The kettle well is exposed first to infection from above; secondly, they never possess walls of such a character as to exclude infection from the surrounding soil. Experienced well diggers assure us that no kettle well, even those with the best cement or asphalt walls can be depended upon to remain absolutely tight. They constantly act in relation to the surrounding soil as powerful drains which receive not only the ground water, but also the surface water. They are protected of course to a certain extent from surface infection by the filtrating power of the soil. Superficial layers, however, are much more loosened up (artificially and naturally) than lower layers, consequently the power of filtration is not so great.

Tube or artesian wells are not exposed to such danger of infection from the upper opening as kettle wells. From the side, from the nature of their construction they are completely free from dangers of infection.

Both wells may be infected if such infection exists, from the ground water.

Fraenkel reviews the subject of the germ contents of ground water, considers the results as unsatisfactory, and consequently in this paper takes up the question anew.

The bored wells which were used for the experiments, were two in number, situated in the court of the Berlin Hygienic Institute, in a part of the city which had been inhabited for a number of years and within a few hundred metres of the Spree. Both had been placed in position about two years and a half previously, and had been little used. At the time of investigation the wells had not been touched for several months; the ground water stood at 4.48m., average day temperature 12° C. (52° F).

Water first removed contained in 1 cubic centimetre 10,800 germs. The large number is explained by the stagnant condition of the water.

| | AMOUNT PUMPED. | NUMBER OF MICROBES. |
|------------------|----------------|---------------------|
| April 10th, 1888 | Litre 2 | 7,200 per ccm. |
| | " 50 | 560 " |
| | " 100 | 154 " |
| | " 200 | 120 " |
| | " 500 | 54 " |

Next day, April 11th, 1888 :—

| | | |
|--|---------|---------------|
| | Litre 1 | 7,000 per ccm |
| | " 50 | 140 " |
| | " 100 | 160 " |
| | " 200 | 84 " |
| | " 500 | 42 " |

April 12th, third day, practically the same results; even when double the amount of water was taken out, the results were about the same.

| | | | |
|--------------|-------|------|-------------------|
| April 13th : | Litre | 1 | Plate fluidified. |
| | " | 50 | 130 |
| | " | 100 | 150 |
| | " | 200 | 42 |
| | " | 500 | 20 |
| | " | 1000 | 18 |

It was apparent from the sudden fall from litre 1 to litre 50 in the number of germs, that the number in first litre is due to development in well itself; this is shown by tables in which every litre up to the first ten was examined.

| | | | |
|--------------------|-------|-----|-----------------|
| April 16th, 1888 : | Litre | 1 | 6,400 microbes. |
| | " | 2 | 5,000 " |
| | " | 3 | 4,200 " |
| | " | 4 | 1,400 " |
| | " | 5 | 800 " |
| | " | 6 | 800 " |
| | " | 7 | 450 " |
| | " | 8 | 380 " |
| | " | 9 | 360 " |
| | " | 10 | 320 " |
| | " | 500 | 360 " |

The same day six hours later the well was again examined and gave :—

| | | | |
|--|-------|-----|-----------------|
| | Litre | 1 | 6,800 microbes. |
| | " | 5 | 3,800 " |
| | " | 10 | 620 " |
| | " | 100 | 80 " |

It is evident that an extremely energetic washing is necessary to remove the masses of bacteria in a purely mechanical way (amount of water actually in pump was calculated at 5 litres, depth of well 8 metres.)

The continued appearance of bacteria after the removal of so much water may be explained by the continual entrance of fresh germs in the incoming ground water at the bottom of the well. But it may also be due to the formation of a zoogloea membrane by the bacteria which stick to side of tubes and small portions of which being given off to water which passes through would give rise to the constant appearance of germs. Then in order to determine the character of ground water it became necessary to thoroughly disinfect tube.

On April 27th, the water showed the following :—

| | | | |
|--|-------|-----|------------------|
| | Litre | 1 | 11,200 microbes. |
| | " | 100 | 110 " |
| | " | 500 | 22 " |

On the 28th the pump was taken out and placed for two hours in a two per cent watery carbolic acid solution; the tube itself was thoroughly washed by means of the long-handled brush, and finally 12 litres of a 5 per cent. solution of Laplace's mixture of raw carbolic acid and sulphuric acid (equal parts of each) was poured into the tube. It quickly sank into the well until finally the water stood at its original height.

Next day the well was pumped out and water examined. After 100 litres no trace of carbolic acid either by odor or by zinc chloride reaction was present; also at 500 litres, gelatine plates from water remained sterile. Well remained sterile for seven days after

disinfection. There was the possibility that carbolic acid still remained in ground water and destroyed organisms there present. Direct experiment showed that sterile water if artificially infected had no injurious effect on organisms ; the sterility of water was due to disappearance of organisms from tube.

After seven days the well was left for one day without pumping. Next day germs had reappeared. Evidently this was due to infection from above, water having been left in undisturbed condition they had had time to develop and form in the zoogloea stage.

Second experiment was disinfection with 40% sulphuric and carbolic acid mixtures. Tube not mechanically cleaned ; results same, remained germ free for six days. Then a gradual reappearance.

Third experiment, less carbolic acid mixture taken but concentrated (2 litres). Taste of acid noticeable for several days after, but gave no reaction with ferric chloride. Remained sterile four days, but not till the 12th day did germs reappear in 500 litres.

Further experiments undertaken with bored wells gave results completely agreeing with above.

Fraenkel notes here that the sterility of water might be due to the fact that carbolic acid had sterilized a layer of soil at base of tube which for several days filtered away the organisms in ground water, but that finally they penetrated this layer and then appeared in well. To overcome this objection he caused well some days after the complete re-establishment of the germs in it, to be thoroughly cleaned out by scrubbing it for half an hour with a long-handled brush. Then water examined gave the following results :—

| | | |
|-------|-----|-----------------------|
| Litre | 1 | innumerable microbes. |
| " | 100 | 780 |
| " | 500 | sterile |

and the well remained sterile for the four following days.

It was evident that germs originate from sides of tube itself and not from ground water. Mechanical cleaning was sufficient to alone remove them.

He concludes, therefore, that except in certain cases (dependent upon soil) the ground water may be looked upon as germ free. Conditions which might lead to an infection of ground water are soil above the water, layer rather loose in character ; water layer too close to upper surface of ground, occurrence of drains in water layer which were not perfectly tight, or finally, the presence of muddy wells.

Finally he studied effects of the disinfection of bored wells upon spores of bacteria. He could not use anthrax spores from their dangerous nature, but used almost equally resistant hay bacillus spores and spores of blue milk bacillus, as well as the micrococcus prodigiosus.

Results were all favorable, sterilization being easy. He tried the disinfectant characters of lime but found there was not sufficient amount of water in bored wells to dissolve it, and that there was danger of spoiling well by formation of a sort of mortar which could not be easily removed.

He next started a series of experiments on two kettle wells, also situated in the court of the Hygienic Institute, and each containing about 1.3 cubic metres of water.

Kettle Well 1. May 10th water showed as follows :—

| | | |
|-------|-----|---------------|
| Litre | 1 | 320 microbes. |
| " | 100 | 130 " |
| " | 500 | 70 " |

May 11th. Two litres containing sulphuric and carbolic acid were poured into the pump and left till following day. Then first water showed strong carbolic reaction, and it could be noticed in water for about a week, gradually becoming less intense.

May 12th, water apparently sterile.

May 13th, litre 500—17 colonies.

May 14th, all three contained colonies, (1,100,500), and an increase in number was noticed from that time in spite of the still considerable amount of carbolic acid in water.

May 19th, 10 litres—carbolic mixture poured in, pump tube brushed out and the water in well thoroughly mixed up. Results were even more unsatisfactory.

May 20th, germs in water in spite of intense odor of carbolic acid, water of a brownish yellow color, and ferric chloride test gave a very marked reaction.

May 21st, germs had increased to an extraordinary number in spite of the presence of considerable carbolic acid. Explains want of success in above experiment as follows :—

In kettle wells, where there is always a considerable amount of water present, a sedimentation takes place of the stagnation contents, and the formation of a thick layer of mud on the bottom. In addition, there is the formation of a much larger amount of the zoogloea layer on the wall than in the bored wells. The very much larger number of bacteria in second experiment than in first is explained by the fact that before the first experiment the well had stood untouched for a long time ; consequently the water had, as it were, been exhausted of all its food material by the bacteria which were in it, and they had all been converted into spore form, and had sunk to the bottom, forming a thick layer in mud.

The pumping out of the water had allowed fresh water to stream in, and the stirring in connection with the experiment had disturbed material at the bottom of the well.

The carbolic acid had destroyed the germs in the water itself, but had not reached those in the mud at the bottom of the well.

It also explains first appearance of organisms in the 500 litre sample *i. e.* in lower layers of water.

Another experiment on the same well combined a large amount of sulphuric-carbolic acid mixture (10 litre conc.) with as thorough as possible a disturbance of the mud layer. The result was not much better, the water was sterile for two days, then came the re-appearance of germs with continued presence of carbolic acid.

Next experiment was on kettle well 2, which was not walled over, but simply closed by a stone which could be lifted.

| | | |
|---------|---------|----------------|
| May 16. | Litre 1 | 6400 microbes. |
| | " 100 | 920 " |
| | " 500 | 180 " |

May 17. Stone cover lifted ; mud at bottom 7.8 cm. thick. By means of a stick with heavy T piece at end, the mud was mixed up with water as thoroughly as possible. Then 10 litres conc. sulphuric-carbolic acid poured in, and the contents of well further stirred up, and the water scraped.

| | |
|---------|------------------------------------|
| May 18. | Germ free. |
| May 19. | " " |
| May 20. | " " |
| May 21. | Germs appeared first in litre 500. |

He concludes that well was not thoroughly sterilized.

A second experiment gave similar results, but a somewhat earlier reappearance of germs, possibly due to sudden rise in temperature.

It is thus evident that sterilization in above manner is not practicable, especially as the long continued presence of the carbolic acid in water prevents its use.

Therefore he endeavored to find the value of lime as a disinfectant for wells, as 1st, Its presence in water does not prevent its use, and 2nd, It has shown itself especially useful in cases where it was a question of the removal of suspended organic matter.

June 9th. Ten kgrms lime was shaken up with four kgrms water, and the whole poured into well (2). Then the well contents were thoroughly mixed mechanically, and finally the water raised to the top of pump in order to disinfect it also.

June 10th. Samples intensely alkaline. Water for the four following days contained a considerable amount of lime in solution.

But three days after disinfection germs appeared in 500 litres, and the moment the free lime disappeared from the water, June 14th, a tremendous increase in germs was noticed.

Results therefore were unsatisfactory.

A second experiment with 25 kgrms lime gave same results.

Experiments similar to those on bored wells with spores of hay bacillus and blue milk bacillus, and culture of micrococcus prodigiosus, showed that 20 kgrms lime was capable of removing them from water.

It is evident from above experiments that a complete disinfection of kettle wells is impossible by means used; but that for the destruction of germs which might possibly get in from above, immediate use of considerable quantity of lime to be recommended.

He concludes that the evidence against the kettle wells is very strong, and agrees with Pflugge (Zeit. für Hygiene Bd. II s. 406) in calling them "hygienic monsters."

He strongly recommends their replacement in all cases by bored wells.

These experiments are to me intensely interesting, published as they were at a time when I had undertaken to determine, with such time and ability as were at my disposal, the bacterial relationships of waters existing under a number of different conditions.

On the 5th of July last the works were opened at the London asylum in connection with the sewage farm intended to dispose of the sewage from that institution. Under the superintendence of the Public Works department, the plans prepared by Col. Waring were completed. The sewage was to be pumped daily to the farm by a Webber centrifugal pump, which finely divided the solids it contained. At the farm the sewage was turned into a number of open ditches eighteen metres deep, by six at top and two and a half at the bottom. Alternating with these were flat beds 12 feet wide, graded to a level surface. Under each alternate bed was a field tile drain four feet deep, increasing to six at the further side of the field where they join a common effluent tile, this leading to an open ditch farther down known as Carling's creek. This flat-bed is composed of a very sandy soil some five acres in extent, and is supplemented by a field of some ten acres, graded for surface irrigation. One-third of the ditches were flooded each day, but the extremely dry weather prevented even a portion of the field from becoming saturated during July and August, and so prevented the attainment of one object of the experiments, viz: the comparison of the biological character of the water running from this effluent tile as compared with the several other waters which were examined. The water samples were taken under the supervision of Dr. N. H. Beemer, of the medical staff of the Asylum, in sterilized and capped tubes sent to him from week to week. The examinations made the succeeding day, while not giving the exact number of the microbes in the water at the time of taking, would yet give the comparative result of the different waters examined. Without giving the exact details regarding the different species, and the results of the different weeks' examination of the few drops of water taken from any sample, this being all that is needed for an examination, I may say that the successive samples of different waters showed a surprising constancy of forms both as regards species and number. For instance:—

1. Tile drain—14 colonies, 10 liquefying, 4 non-liquefying.
2. Effluent from sewage farm, 6 liquefying, 3 non-liq. One week only.
3. East Creek—All portions of culture showing innumerable slowly liquefying colonies, all the same form apparently—probably *m. candidans*.
4. Carling's Creek—All portions of the gelatine show innumerable liquefying points with whitish granular particles in the larger liquefactions.

Nos. 5, 6, 7 were practically sterile, showing as they did only one or two forms which were not moulds—few in number, some seven in all in the whole series of cultures. The notable fact gained was, however, the innumerable bacteria present in the open water of creeks. Samples taken again and again from both Carling's creek and East creek always produced one form in great abundance—probably *m. candidans*—in the latter in greater abundance as the water with the drought became less in quantity and more impure. It was always with much satisfaction that our inoculations of London city water indicated practical sterility—taken as it is from springs appearing at same height above the river bank below the city and gathered in a small collecting gallery. The samples were taken from a city tap. The same sterility was found in the water taken from a faucet in the pump-house at the Asylum, the water coming from a bored well of considerable depth. The water from the tank at the top of the building showed occasionally a

mould or two, as would be expected from a tank in a confined space at top of the house. Not less interesting is the fact that the water arriving at the mouth of the tile yielding sub-surface drainage from a field was practically free from bacteria. The effluent water from the tile drain leading from the sewage farm, the one week that a sample could be obtained showed as great freedom from contamination as did the other tile water. Of course, there had been no time for polluting the soil, and this was probably ordinary sub-surface water. It showed, however, that the field, some five acres in extent, was capable of absorbing more than 100,000 gallons daily without supersaturation in dry weather. A letter received in March last from Dr. Beemer says so far the farm, during this whole winter, shows no surface collection of a notable character, although the soil everywhere, as we know, has been in a condition of almost complete and constant saturation.

Now, without making any positive statements, I think that as regards this whole matter of natural waters, we may fairly draw the following general conclusions:—

1. That, while the atmosphere as compared with the soil is relatively free from bacterial life, yet rain water bears to the earth from the air and gathers from the roofs, etc., the elements of auto-contamination, and finds in the organic matters gathered from roofs, etc., abundant nutriment for its contained germs.

2. That falling on the surface of the ground waters become contaminated.

3. That of these contaminated waters probably 50 per cent. are not absorbed but follow the surface inequalities into brooks, and thence into the larger streams and great lakes. The brook as it passes through virgin soil collects much albumenoid matter which affords abundant nutriment for microbes, borne into it from every side, and when the stream reaches a part where barnyards and other sources of sewage pollute it, it is likely—nay certainly will—become contaminated with bacteria of a dangerous character.

4. Where gathered into the great lakes deep and hence very cold, with a constant aeration going on and constant exposure to sunlight of their great areas, there occurs a great diminution in the bacteria of the water through a lessening of the organic nutriment for microbes, and hence a great halt in the multiplication, owing further to the low temperature, aeration and exposure to sunlight.

5. Rivers, shallow lakes and bays along great lakes, and these especially during those periods when by evaporation their volume is so greatly diminished, are likely to become very impure, and the causes of their impurities are likely to remain more or less permanent.

6. The fifty per cent. of rain water which is absorbed by the soil has a different history. Loaded with impurities in the upper layers of the soil, it passes slowly by percolation downward and loses gradually through capillary attraction, lessened nutriment, decreased amounts of oxygen and increased amounts of carbonic acid, its previous bacterial pollution, and with few exceptions appears in springs and subterranean streams where tapped, either by tube or the common pit wells, as absolutely sterile or wholly devoid of bacterial life.

7. That in the tube well with careful driving of the iron tube to prevent soakage along its outside, and a brief pumping to carry off the contaminating bacteria which reach the inside through aerial contamination, we can obtain a practically sterile water of the first quality for drinking purposes.

8. Through organic soakage in the upper and most readily accessible direction for the lateral movement of subsoil waters, such waters carry abundant nutriment for bacteria, which are carried in in the same manner also by the filthy washings of the top and from the air which occupies the pit. With little aeration, the absence of sunlight and a temperature in shallow wells affected by external temperatures, conditions most favorable for the development of bacteria exist. Hence these wells under ordinary circumstances, but especially when found in back yards, under kitchens, in barnyards or as shallow dug-outs in the black soils of the west and all newly settled countries are veritable pest-holes, more dangerous to the health than probably all other local sources combined, in those seasons when low temperatures do not prevent bacterial development. They are in reality what Pflugge calls them, "hygienic monsters."

I cannot do better than conclude this subject, which is exhaustless, by quoting words of Duclaux, "One suspects more a water which receives a minimum quantity of excremen-

titious matters than a water which might be charged with germs after the water had run over a desert region. This question of the nature of germs is too important for us to dream of limiting it to the length of this review, already long, in which we have wished to study the question of quantity. But in waiting that one may find the means of indicating in a water the hurtful or pathogenic germs which it contains, and having found in this way a measure of their degree of nocuousness, we confess that the only waters to be recommended are those which contains no germs at all."

2. Outbreaks of Disease.—The year, apart from the extensive outbreak of diphtheria in the northern districts of the Province, which prevailed in the beginning of the year, and was referred to at length in the report for 1888, has been notable as showing an immunity which is certainly unprecedented during the years since the formation of the Provincial Board. A table which appears under the sub-heading of Diphtheria amply illustrates this fact. What proportion of this has been due to the meteorological conditions which have prevailed during the year, it would be difficult to say; but the short-lived existence of the two or three outbreaks of smallpox which have occurred, cannot fail to give prominence to the fact that the organization of Local Boards of Health and the executive powers in matters of epidemic disease which have been laid upon them, as also upon this Board, have played no small part in preventing outbreaks which occur from time to time from assuming those proportions which formerly was no unfrequent occurrence.

a. La Grippe.—Exception to this general immunity needs to be taken in the widespread—we might say universal—existence of La Grippe which, in the last months of the year, made its appearance in rapid succession in the different parts of this Province, and continent, resulting through its depressing and exhausting effects on the nerve centres, in the appearance of sequelæ which unfortunately proved fatal to many adult members of the community.

So much has been said and written on the subject, both in the medical and public press, that it would seem unnecessary to further discuss the subject, since in the matter of causation, it must be classed with those epidemics whose genesis depends some initial unknown cause, but of which the conditions for dissemination can in some degree be tolerably well comprehended.

Such pandemics, we must assume, depend upon those general meteorological, local and individual physical conditions which govern the appearance and spread of certain other contagious diseases; and we cannot, while confessing our ignorance as to the exciting cause, the less urge the dominating influence of house atmospheres, under the conditions which prevail in civilized communities, in directly intensifying the virus, both in its rapid multiplication and in the opportunities for infection by personal contact thereby created.

b. Small pox.—As for several years past the appearance of this disease has been but slight while its extinction has been speedy and its extent very limited.

As will appear, however, in the special reports found on a later page, an outbreak which for a fortnight assumed a threatening aspect, occurred at Fingal, in Elgin county in the latter end of February, resulting in some 43 cases and 13 deaths.

The accident of its not being diagnosed as smallpox in the first two cases caused such a number to be exposed to it, as under other circumstances would have been impossible. When the diagnosis of the several fatal cases was correctly made the alarm became widespread, and the aid of this Board was called in.

Visits were made to the infected districts first by our late colleague, Dr. Mackay and later by your Secretary, and certain additional measures in addition to those already taken by the local authorities were made in order to have the disease stamped out almost as promptly as the time taken for existing cases to recover made possible. Not more interesting is the way in which adjoining municipalities took energetic measures to protect themselves against the possible introduction of the disease. Medical Health Officers, if not already appointed, which was, indeed, in a very few instances the case, were at once appointed, vaccination stations fixed by the councils or Local Boards, and public vaccination carried on in a very generally. Reference to the disinfecting precautions undertaken in such instances as that by the

Local Board of Aldborough causes us to conclude that, regarding smallpox at least, the Local Boards of Ontario have learnt about all that is to be known on the subject. While the fact of its mode of introduction illustrates how essential vaccination is, yet the number of persons vaccinated subsequently within a fortnight amply shows how ready our people are to believe in and undergo the unpleasant operation of vaccination. The experience with outbreaks in the past in this Province would almost incline us to the opinion that in countries having a comparatively thinly-distributed but intelligent population the annual compulsory vaccinations of European countries, with their dense populations, are largely unnecessary, so rapidly can infected centres be circumvented. But in view of the fact that a very large proportion of our population are more or less perfectly protected at present by vaccination such a conclusion could only fairly be arrived at under conditions which at present do not exist. Suffice it to say that prudence in the matter of prophylaxis makes it most desirable that at an age when a few days' *malaise* causes no loss of working-days, and when disease of a general character is less severe, the provisions requiring all school children to be vaccinated ought to be systematically carried out.

The report of the outbreak in Elgin found in a later part of the report contains the essential points of interest with regard to it :

The second and less serious outbreak of smallpox occurred, as will be gathered from the subjoined report, in an unusual manner, and, owing to the isolated position of Pelee Island, presented, on the one hand, special advantages in the way of isolating the infected area from the general community, and, on the other, special difficulties, owing to the difficulty experienced in obtaining medical assistance and of maintaining close communication with the afflicted settlement. Too much praise cannot be bestowed on the Local Board, who, wholly unused to dealing with outbreaks of disease, took such prompt measures as to secure within a few days the vaccination of every person on the island, and to isolate those attacked, thereby limiting the attack to six persons, all of whom had been exposed before the nature of the disease was really comprehended.

In consequence of the only practitioner on the island being the first patient, the community was placed in the peculiar position of having no other medical man to appoint as medical health officer. In their need the Provincial Board arranged to supply the temporary deficiency, but again the energy of the Local Board made any action required on the part of this Board wholly advisory. That only one death occurred is most commendable to those engaged in stamping out the disease.

The following report of the outbreak will be read with interest :

TORONTO, October 29th, 1889.

MY DEAR DOCTOR.—Pursuant to instructions received October 16th, I proceeded at once to Pelee Island where it was reported was an outbreak of smallpox.

Before crossing, however, from the mainland I called upon Dr. Sutherland, Health Officer of Leamington and Township of Mersea, also upon Dr. King, acting Health Officer of Kingsville and Township of Gosfield South, urging upon them the immediate enforcement of those clauses of the Public Health Act relating to compulsory vaccination—the necessity of which you had previously notified them of by letter. I have now the pleasure of reporting that compulsory vaccination is in force in the before mentioned towns and adjoining townships.

As this is the first occasion upon which Pelee has appeared upon the public health records as the seat of an outbreak of any epidemic or contagious disease, I may be pardoned for briefly referring to a few facts as to position, etc., of the Island. Lying about 16 miles to the South of Essex County, situate near the western end of Lake Erie, close to the international boundary-line, it is the most southern point in Canada. In area a little over 10,000 acres, its extreme length, 11 miles ; and greatest breadth, $8\frac{1}{2}$; the population scattered throughout its whole extent, numbers 513. The principal point of communication is Kingsville, which at this season of the year is not regular.

The first case of smallpox appeared upon the west side of the island during the first week of October. (History of case appended "A.") but was not seen by a medical man until October 11th, when Dr. Chamberlain, Leamington, (to whom I am indebted for the history) was called in ; when then seen the eruption extended pretty well over the body surface, being in character vesicular.

The patient, who had been boarding at the hotel from September 24th or 25th, was removed October 9th to the house of Mr. Mickle, 1,000 feet to the north, and it was there he was seen

by Dr. Chamberlain. McKee, school teacher, who had been acting as principal nurse, accompanied the patient—the house was occupied by Mr. McKee's wife and girl—and since the nature of the case has been ascertained has been used as special hospital; it is marked B* in plan.

Although I believe Dr. Chamberlain did not notify the Local Board of Health as to the case being one of smallpox, yet his mentioning the fact to those more immediately in attendance, was the cause of the meeting of that body promptly the next morning, and in the absence of any medical officer to advise, and the passing of orders as per B, from the date of Dr. C's visit (October 11th) until the 17th, when Dr. Duffield, Health Officer of Detroit, Mich., accompanied by Dr. Campeau Health Officer, Kingsville, visited the island, the people were without medical aid or advice. The result of this visit was that Dr. Campeau was appointed Local Health Officer, and strict quarantine was enforced by a sanitary constable.

It was not until Saturday October 19th, I was able to reach the island, the condition of affairs was then as follows: (See plan.)

In the hospital B* one case—Dr Snider attended by McKee, who had nursed the case from beginning, also male nurse appointed by the Board of Health, (had smallpox some years ago.)

In quarantine were 22 persons, being all whom the Health Officer could ascertain as having been liable.

A.—Hotel where case was until October 9th.

| | | |
|----------------|---------------------------------|----------------|
| Robert Little. | Mrs. Little and three children. | Mrs. Nickison. |
| Miss Keoberly. | T. R. Lidwell. | C. Maitland. |
| B. Chatfield. | F. Keeley. | R. Prescott. |
| — Longhurst. | | |

| | | |
|-------------------|-----------------------|------------------|
| C.—Hy. Mickle. | Mrs. Mickle and girl. | A. M. McCormick. |
| Norman McCormick. | | |

D.—Miss Mary McCormick.

E.—(Over one mile south of dock.)

| | | |
|--------------|--------------|------------------|
| H. Cornwall. | F. Matthews. | A. O. McCormick. |
|--------------|--------------|------------------|

The above persons had been vaccinated and the hotel had been partially fumigated—the want of sufficient drugs only preventing its having been fully carried out.

The right course not having been taken to enforce the compulsory clauses of the Health Act, a meeting of the township council was convened on the Monday and action taken—three centres being chosen where the inhabitants could meet the public vaccinator—a large number had, however, been voluntarily vaccinated.

Up to the time of my leaving three (3) new cases had developed amongst the quarantined, they were: T. H. McKee, N. McCormick, A. O. McCormick. The last case assumed the hæmorrhagic form and proved fatal.

As to the carrying of passengers, etc. to the mainland I instructed none to be taken, but those having certificates from the Local Health Officer and notified the Health Officers of Kingsville and Leamington to receive only his certificate as proper guarantee.

All of which is respectively submitted.

I have the honour to be,
Yours truly,

CHAS. S. HODGETT, M.D., L.R.C.P., London.

P. H. BRYCE, Esq., M.D.,
Secretary Provincial Board of Health,
Toronto.

HISTORY OF CASE.

Dr. Snider returned to Pelee Island after having paid a two weeks' visit to friends living at 93 (101 new number) Nassau St., Toronto, travelling September 24th, by the train leaving the city at 7 a.m., going via St. Thomas and Comber to Leamington, taking the Str. Lakeside that evening, arriving at the island on the morning of the 25th.

He first complained of being unwell October 4th, headache, slight chills followed by elevation of temperature, 101°F. pulse, 120; slight nausea, tongue furred; he continued so for about two days with a little delirium; upon the 6th he took to bed. temperature, 104°F.; next day (7th) he suffered from persistent vomiting and severe pains in both legs; on the 8th he had

severe abdominal pain, the fever was lessened. An eruption appeared on the 9th upon forehead and chest, which eruption when seen by Chamberlain, October 11th, was extended pretty well over the whole body, vesicular, umbilicated and pathognomonic of the disease.

The doctor had been vaccinated about 15 years ago. Dr. Chamberlain says not a good mark.

PELEE ISLAND. October 12th, 1889.

A meeting was held by the Local Board of Health of the Township of Pelee, on above date, to take measures to prevent spread of smallpox, a case having been found in the house of Henry Mickle in this township.

Present, Thaddeus Smith, A. M. McCormick, P. M. McCormick, Reeve, and J. H. C. Atkinson, Clerk.

Whereas, Dr. Snider has been pronounced by Dr. Chamberlain, of Leamington, to be suffering from smallpox. Be it therefore ordered by the Local Board of Health, of the said Township of Pelee :

1. That the house of Henry Mickle, in which said patient now is, be isolated and placarded, and that no one but those of the family and nurses of the patient shall enter said house.

2. That all persons who have come in contact with said patient, shall keep themselves isolated from the public by staying within their homes or other house for at least nine days from the last time when they were with him, and that they shall thoroughly disinfect their rooms, clothing and bedding by fumigation, and that all persons are warned from entering any house where those persons are, who have been in contact with said patient.

3. That Robert Little, of the Island Home Hotel, is ordered to close his house against all persons except those who have been already exposed to the disease in said house (the said patient having been removed therefrom before the nature of the disease was known) for at least ten days, and that he shall also thoroughly disinfect his house, bedding and clothing by fumigation, and that the said hotel shall be placarded.

4. That A. M. McCormick, postmaster and storekeeper, be directed to thoroughly disinfect his store and postoffice by fumigation.

5. That T. H. McKee, teacher of No. 1 school is ordered to close said school till further notice.

6. That Griffiths, teacher of No. 2 school, is ordered to close said school till further notice.

7. That all public meetings at churches and other places in the township are forbidden till further notice.

8. That a nurse be employed to attend the above-named patient, Dr. Snyder.

9. That vaccine points or matter be procured and placed at different points upon the island; and that all persons are required to be vaccinated as provided by law; and that the following named persons be appointed to do the vaccination, viz.: Griffiths for the north end, Oscar Fox for west side, Mike Diffenback for south end.

10. That 100 pounds of sulphur, one quart carbolic acid and half pound corrosive sublimate for disinfecting purposes be procured for distribution and use by those required to use it.

TORONTO, December 9th, 1889.

MY DEAR DOCTOR.—Having again visited Pelee Island and acted for a period of three weeks as Health Officer of the municipality, it is with pleasure I have to report the occurrence of only two fresh cases during the eleven days which elapsed between October 24th and November 5th, the cases being those of Mr. Arthur McCormick, mentioned as having been quarantined, the other Mr. Wm. McCormick who had been living in the house where Miss Mary McCormick was quarantined and must have been exposed sometime in the early part of the outbreak, that is previous to Dr. Campeau taking charge—as it was certainly not after. Dr. Campeau, of Kingsville, acted as Medical Health Officer from October 17th to 31st, vaccinating at the homes as also at the public stations—and it is no doubt due to the prompt vaccination and well maintained quarantine during the early days of the outbreak that I have to report so few cases and early termination of the outbreak.

During my term of office I made a house to house visitation, recording the names, ages, date of vaccination—appearance of mark, dates to subsequent vaccinations with result—the above record I leave with the local authorities for future reference, if occasion require—in this manner I examined some 504 persons and of these I vaccinated 100.

The houses mentioned as "C," "D" and "E" in my previous report, I thoroughly fumigated and disinfected before the persons quarantined therein were free.

The first case, Dr. Snider left the hospital November 22nd, great care being taken with the disinfection of his clothing and effects as well as that of his person. He being now able to resume professional duties I resigned in his favour—remaining, however, some days longer when I felt a spirit of confidence would have taken hold of the more timid of the inhabitants. Before closing I would like to add a word of praise for the manner in which Dr. Snider attended to those, his fellow sufferers, with him in the hospital, at a time when his own physical condition could but ill bear the strain which his indefatigable efforts placed upon it.

Respectfully submitted,
Yours very truly,

CHAS. S. HODGETT, M.D., L.R.C.P., London.

An interesting point arose in connection with the arrangement made by the Provincial Board with a physician who, though a licentiate of the Royal College of Physicians, London, was not registered in Ontario, to act as a medical officer for Pelee Island. It will be remembered that during the diphtheria epidemic in the Parry Sound District, in the early part of the year, the Board employed for two months two medical inspectors, one of whom was the gentleman employed in the Pelee Island outbreak and the other a final student of high standing from one of our medical colleges. The action of the Board in the matter of the Pelee Island appointment was questioned by the Royal College of Physicians and Surgeons, and an explanation was cheerfully accorded which we trust was satisfactory. It cannot be forgotten that work of the kind undertaken by medical inspectors of the Board is of an unusual, often dangerous and disagreeable, but in the nature of the case of a temporary character. Not only this, but the call for active measures is always sudden and unexpected. In many instances a medical inspector has left home for an infected district within an hour or two of the receipt of a telegram. With no permanent staff for this work, the Board has to depend upon physicians who by accident are in a position to leave home without detriment to the interests of their patients or their own practice. Such are most commonly students finishing their course. Were the Board unable to obtain the services of such it frequently could obtain none, greatly to the detriment of the public interests, since I have at times vainly endeavored for several days to obtain for more difficult and dangerous undertakings the services of such a person as would be satisfactory. Two objects in such work are to be sought, viz.: expedition and efficient action. The credit of the Board can only be maintained by striving after both, and the assurance is freely given to all interested in the maintenance of the status of the profession that the Board recognises that its own dignity and credit will cause it to select, where possible, for its officers those whose registration stamps them with a presumed efficiency and suitability for its work, where such can be had without the dangers incident to delay in obtaining them.

(c) Diphtheria.—In the Report for 1888, in the report on diphtheria, I discussed in an extended manner the beginning and spread and the measures, in large degree successful I am happy to say, for stamping out the disease in one portion at least of our northern territory. That portion of the Report which belonged to 1889 will not here be referred to further than to say that the fact of there having been but few cases which have since occurred there is in harmony with what seems to have marked this disease in most other parts of the Province. It is yet too early for an examination of the Registrar-General's returns for 1889, but the reports obtained from different sections during the year, and more particularly the reports of Local Boards, lead to the inference that a marked decrease in the mortality from this disease has taken place. What peculiar atmospheric influences have favored this result it may be difficult to adequately recognize, though doubtless such existed, but I think from an examination of the reports of Local Boards it will not be difficult to gather that the most important agency which has been at work has been the isolation of first cases and of the families wherein they have occurred, and of disinfection of the houses and clothing after the disease has disappeared. While it is to be regretted that comparatively few municipalities have as yet supplied efficient means for the removal of first-

cases to isolated hospitals or "houses of recovery," yet the advance that has been made in a few instances is little short of extraordinary. Guelph, Brantford and Brockville are leading in this matter, and nothing so well illustrates the truth of the principles which have for several years past been urged by this Board, based upon our own experience in Ontario with regard to smallpox, and in England with reference to both scarlatina and diphtheria, regarding the advantages to be gained in the matter of the saving of life, expense and time, by the removal of patients from their homes and by treating them in isolated hospitals.

The report of the Guelph Local Board presents a phenomenal development in this work, but probably not more than Brantford if we remember the recent period at which the city hospital in the latter place was constructed. The figures for Guelph are given. They are of so much interest and importance that we must give them some special attention.

The Guelph General hospital, as also the St. Joseph's Roman Catholic hospital, have existed for more than ten years, but up to 1884 no provision had been made in either for the reception of contagious diseases. At the General a small building was then erected, but some three years ago an Annex to the General hospital was specially designed and erected for the treatment of contagious diseases.

The town has unfortunately had for nearly ten years a bad record in the matter of diphtheria, and typhoid has appeared and to some extent increased.

The report of the Local Board refers very especially to the cause of this in the almost complete absence of sewers and the increasing contamination of the soil. Although having an adequate public water supply in many parts, it is by no means universally used, while further an area of territory between two dams, as already referred to, maintains a nuisance increasing as the years go on. While these facts make it appear that the work of public reform is undertaken in the reverse instead of the natural order, yet it is of much importance that the results of existing unsanitary conditions are being minimized to the greatest extent possible.

The following figures give the total cases reported and the number of patients suffering from diphtheria and typhoid treated in the hospitals :

GUELPH.

| | Case reported. | Deaths. | Treated in hospital. | Per cent. treated in hospital. | Per cent. of deaths. |
|-----------------|----------------|---------|----------------------|--------------------------------|----------------------|
| Diphtheria..... | 221 | 18 | 188 | .62 | 8.1 |
| Typhoid..... | 28 | 2 | 23 | .85 | 7.1 |

It becomes apparent from these figures that three things have been definitely proved: 1st, That a small city (10,000 inhabitants) has not found it any excessive burden to erect a hospital, since two hospitals exist, and in one at least a large and commodious Annex for contagious diseases has been constructed ; 2nd, That no difficulty is experienced in convincing the general public of the gain both to the family and patient of having cases removed from their homes to the hospital for treatment ; 3rd, That a large expenditure of time, money and life has been prevented to the people of the town as individual families, and who have without any sense of burden undertaken the expenditure in their collective capacity.

That the same results are obtained in Ontario as in England, viz.: a relatively decreased death-rate in proportion as the number of cases reported as being treated in isolated wards increases, is very well shown by a comparison of the deaths to cases reported in

Guelph as compared with any other towns and cities in the Province. The following table to illustrate this will prove of interest :

| CITIES. | Diphtheria. | | | Typhoid Fever. | | | Number of deaths per 1000 of population. | |
|----------------------|----------------|---------|-----------|----------------|---------|-----------|------------------------------------------|------|
| | Cases reported | Deaths. | Per cent. | Cases reported | Deaths. | Per cent. | 1889 | 1888 |
| Brantford | 58 | 15 | .25 | 89 | 9 | .10 | 14.3 | 15.9 |
| Belleville | 4 | 0 | .. | 3 | 0 | .. | 16.4 | 13.6 |
| Guelph | 221 | 18 | .08 | 28 | 2 | .07 | 13.0 | 16.8 |
| Hamilton | 62 | 15 | .24 | 149 | 6 | .04 | 15.3 | 16.0 |
| Kingston | 52 | 9 | .17 | 27 | 6 | .22 | 16.7 | 11.6 |
| London | 34 | 9 | .26 | 37 | 4 | .10 | 13.1 | 14.2 |
| Ottawa | 134 | 61 | .45 | 67 | 18 | .26 | 22.8 | 23.9 |
| St. Thomas | 12 | 1 | .08 | 2 | 2 | .1 | 11.1 | 12.6 |
| St. Catharines. | 12 | 2 | .16 | 27 | 7 | .2 | 12.6 | 20.6 |
| Toronto. | 299 | 72 | .24 | 273 | 48 | .25 | 14.4 | 20.3 |
| TOWNS. | | | | | | | | |
| Barrie..... | .... | .. | .. | .. | .. | .. | .... | .... |
| Brockville..... | 27 | 3 | .11 | 23 | 1 | .04 | 12.0 | 15.8 |
| Chatham..... | 62 | 3 | .04 | 35 | 6 | .17 | 18.0 | 12.2 |
| Galt..... | 20 | 1 | .05 | 5 | 1 | .20 | 9.8 | .... |
| Goderich..... | 10 | 4 | .40 | .. | .. | .. | 8.8 | 16.7 |
| Lindsay ..... | .... | .. | .. | .. | .. | .. | .... | .... |
| Owen Sound..... | 24 | 5 | .20 | 5 | 0 | .. | 13.1 | 10.2 |
| Peterboro'..... | 5 | 1 | .20 | 3 | 0 | .. | .... | 14.7 |
| Port Arthur..... | 5 | 0 | .. | 6 | 1 | .16 | 12.6 | 13.3 |
| St. Mary's..... | 5 | 1 | .20 | 3 | 0 | 0 | 6.5 | 11.3 |
| Trenton..... | 7 | 3 | .42 | .. | .. | .. | 15.2 | 12.2 |
| Windsor | 5 | 0 | .. | 4 | 2 | .50 | 13.4 | 12.9 |

Thus we see that with 221 reported cases of diphtheria in Guelph there was a death-rate of only $8\frac{1}{10}$ per cent., and of typhoid, with 28 cases, there was a death-rate of $7\frac{1}{10}$ per cent. Of the former 62 per cent. and of the latter 85 per cent. were treated in hospital.

In Brockville again with 27 cases of diphtheria, of which 50 per cent. were treated in hospital, there was a death-rate of but 10 per cent., and with 59 per cent. of typhoid cases treated in hospital there was a death-rate of but little over 4 per cent.

That similar results are not seen in the cases of such cities as Ottawa would seem due to the fact that a relatively small number of cases of these diseases was reported to the health office since it would seem impossible, that in Ottawa there could have been a death-rate of 45 per cent. from diphtheria.

What the results have been in similar instances in England can be gathered from the following extract, which I have referred to in former reports :

Of evidence of the value of notification and hospital isolation, especially in the case of smallpox and typhus in Salford, no fewer than seven separate importations of the former disease and six of the latter have taken place since the Notification Act was passed five years ago, and yet, in no single instance has either of these diseases gained a foothold in Salford, whereas, in the four preceding years, before notification was compulsory, those diseases invariably spread and did a serious amount of mischief."

Summing up the advantages, as I expressed them before the International Conference of State Boards of isolation hospitals, they are :—

1. It makes the *raison d'être* for notification evident, and throws the onus of responsibility on the family physician and householder, should disease spread from the house as a centre.

2. It throws an equally great responsibility on the health department if after notification other cases occur in a house either through neglect of immediate inspection of premises and providing local conveniences for isolation of first cases.

3. It supplies an argument for better house isolation since the responsibility of the house isolation, proved by no other cases occurring, is upon the householder, for should other cases occur he cannot fairly object either to a quarantine of the household or to a removal of all existing cases and a thorough disinfection.

4. Should house isolation prove a failure then the health authorities have public sentiment in their favor in enforcing the general provision for removal of all first cases.

5. It does away entirely with the opprobrious, vexatious and useless methods of placarding, since the method is unnecessary where after a statement of the requirements of the law, householders willingly remain quarantined, or useless, for if a patrol be required by his presence to enforce quarantine, then the placard is superfluous.

6. It is in the highest sense humanitarian and economical. It is in many instances absolutely impossible for the mother of a large family to nurse *e. g.*, a case of diphtheria, and attend to the many other household duties.

7. It is cruel to permit a poor family to be with an almost certainty afflicted in all its susceptible members with disease so fatal, and it is unjust and absurd to expect a wage earner to be prevented from earning the necessities of life, while with almost absolute certainty house quarantine will extend the area and period of sickness, inflicting as well unnecessary doctor's bill and a tolerably certain undertaker's levy.

That the views which are here and have been before advanced regarding the advantages of isolation hospitals are rapidly spreading is seen in the fact that out of these 24 towns, 10 at least having hospitals have had contagious cases treated within presumably contagious disease wards or annexes, while some other towns have at least isolation hospitals for smallpox.

Regarding the year's record of diphtheria, however, it is pleasing to have to state that, with the exception of the severe outbreak in the frontier district of Parry Sound, an extended report on which was contained in last year's report, the year has shown an evident decrease in the prevalence of this veritable plague of our municipalities.

It would appear that this is very largely due to the more correct views that are yearly spreading amongst the medical profession and the general public regarding the contagious nature of the malady, and of the insidious methods by which, owing to the lingering nature of the contagion in the air passages, the *materies morbi* is disseminated.

The results of some of the most recent investigations regarding this disease are extremely interesting.

In the last Report of the Medical Officer of the Local Government Board of Great Britain, Dr. Klein has published the results of an extended series of investigations into the bacterial origin of diphtheria, starting from the point of endeavoring by experimental evidence to determine the value of the discovery by Loeffler of the bacillus of diphtheria.

Though not confirmatory of Loeffler's researches they are interesting as tending to elucidate certain obscure relationships which seemed to have existed between diphtheria in man and by no means infrequent diseases in the lower animals.

It will be seen that the experiments point to a different microbe and one occurring in a manner different from that which Prof. Mitchell Prudden, of New York, claimed as causative of diphtheria in a number of experiments made by him with a streptococcus found in the buccal tract of persons either sick with diphtheria or in some cases who had been exposed to air bearing diphtheria germs, as in the wards of the Sick Children's Hospital.

We do well, however, to recognize that in every case the disease has been shown to be communicable by inoculation; hence for prophylactic purposes it becomes manifestly necessary on the part of physicians and officers of health to adopt the most complete isolation and disinfectant precautions which are possible.

(d) **Enteric (Typhoid) Fever.**—The past year which, during the later summer and autumn months, was in many parts of the Province favorable to the prevalence of this disease cannot be said to have developed it in any locality to that extent which would fairly entitle it to be termed epidemic.

While this may be true in a general way, yet the reports which have been received from a number of the smaller towns and villages indicate that with added years the soil pollution of these places is becoming more complete and that only favorable atmospheric conditions are required in order that the poison of the disease may become fully developed and carry on its deadly work.

The following letter is an illustration :

PENETANGUSHENE, August 31st, 1889.

Dr. Bryce :

DEAR SIR,—There seems to be an epidemic of typhoid fever in this town at present. There have already been five fatal cases and new cases developing almost daily. I think the sanitary conditions of this town need looking after very badly. Hoping this will receive your prompt attention,

I remain,

Yours respectfully,

W. F. THOMPSON.

The following letter was received in answer to enquiries made by me of the Local Board :

PENETANGUSHENE, September 5th, 1889.

P. H. Bryce, Esq.,

Secretary Provincial Board of Health, Toronto :

DEAR SIR,—In reply to your favor of the 3rd inst. I would say that during the month of August there were two deaths from typhoid fever. The first was a young man and it is supposed the attack was caused by impure water. The second was a Mrs. T. The reason ascribed for her illness was that the cold and dust from the furnace emptied into her bedroom and took its supply of air from the store cellar where all kinds of vegetables were kept and fish were packed. I may say that there were two deaths during July, also both supposed to be from impure water. The whole of these cases were confined to a small area of the town and I may say the Local Board are making a thorough investigation and are enforcing the regulations of the health by-law in regard to privies, etc.

I am, your obedient servant,

H. JENNINGS,

Sec. Local Board.

While in several towns where house-plumbing is defective, in neighborhoods as in small towns and suburban localities where slaughter-houses, knackeries, etc., exist, we may find cases of typhoid ascribed very properly to such exciting causes, yet it may fairly be said that the letter of the Secretary of the Penetanguishene Board gives in a few words the story which can be told of the hundreds and thousands of outbreaks of typhoid which appear in isolated groups in cities, towns or country surrounding some common source of water supply.

Why this should be is fully explained in a preceding section on underground waters, and hence need not here be further discussed ; but not until wholly new views exist in the minds of people regarding the sources of water and of their pollution can we hope to find a notable improvement in this matter.

3. Outbreaks of Contagious Diseases in Animals.—In the special reports succeeding this general report of the Secretary will be found references to one or two outbreaks of diseases amongst animals, which were brought under the notice of your Secretary.

(a) **Cerebro-Spinal Fever.**—The first of these was a localized but fatal outbreak of what seemed to be contagious cerebro-spinal fever. The investigation seemed to localize the cause in the stable where the horses were kept, and a common cause seemed to have operated on all as they took sick within a few hours of one another. A developed septicaemic poison due to putrefaction of the accumulated filth of the horse mangers during a sudden accession of hot weather seemed to be the most reasonable explanation.

Another serious and widespread epidemic of a very unusual character appeared in horses in Kent and Lambton counties during May and June, the breeding season. It was a venereal disease with affinities to gonorrhœa, and the study of its character and phenomena became the subject of a commission of enquiry and report by your secretary which has already appeared in pamphlet form. The investigation, and legislation which has resulted therefrom have been extremely successful it would seem in lessening the extent of the disease during the present breeding season.

(b) **The Flour Moth (*Ephestia Kuhnella*).**—A third outbreak of a novel and unusual nature, which appeared as an insect plague, was the occasion of active measures being taken under section 99 of the Public Health Act. Though causing costly and troublesome measures for the extermination of the plague it is pleasing to be able to say that so far as reports have been received there has been no re-appearance of the insect as a pest this season.

The following is a copy of the bulletin published on the subject :

At a time when the milling industry of Canada was limited to the work of grinding with the end of supplying the local demand for flour and feed, the use of the various grades of wheat and other grains, obtained from the area of country in the neighborhood of different mills, was all that seemed necessary. As, however, means of transit such as railways and waterways has increased, milling industries have developed to such an extent as that large mills have to go to distant parts of Canada or the United States for their supplies in response to the demands upon their business, as regards both quantity and quality. With transshipments of grain from outside regions there have been introduced not only the grain products of varying quality, but there have also been at times associated with such importations the seeds of plants and the eggs of insects peculiar to these countries, and which have grown amongst or have been parasitic upon the various grains with which they have been introduced. In addition to weeds and insects, at times injurious, introduced in this manner, we find that insects feeding upon and peculiar to these grains have at times been imported through the development of those branches of business which utilise either the raw grains or the milled products of starchy foods, especially adapted to children's foods, such as tapioca, cornmeal, semolina, etc. Other means of distribution of these insects foreign to Canada is found in the transshipment of flour in bags, and the return of said bags, which may have been for a time stored in a ship, granary or store-house, etc., infested with such insects.

In an article on "Screenings" in the Report on Injurious Insects for 1889, published by the Agricultural Department of the Privy Council of Great Britain, Miss E. A. Ormerod, the entomologist, says with regard to the Hessian Fly :

"Another possible method of introduction was transmission in chaff and rubbish from foul corn imports, and this probability was greatly strengthened when we found that the 'flax-seeds' were detached from the straw in great numbers by our threshing machines, and that, in the process of cleaning the corn, these 'flax-seeds,' or chrysalids, were thrown down with the light weed-seeds and rubbish. We thus learnt that they *could* be detached, and thus we arrive at the point that where corn is sent over foul, with the chaff, dust, rubbish, etc., still in it, to the amount to which it often comes, that it is highly probable that if the crop out of which the corn was threshed was infested by Hessian Fly the infestation will be imported, and will be spread abroad by distribution of cheap screenings.

"But beyond what may happen as to introduction of this one special crop-pest, in addition to the weevils, beetles, etc., which it has long been known infest imported cargoes, as well as granaries on land, it appeared that in what may be called the 'crop rubbish' thus imported there was broken straw, masses of caterpillar-workings, and bits of broken ears, with other impurities quite suitable for transmitting crop-insect infestation, besides other matters, such as ergot, weed-seeds ; infested crop-seeds, as maize, beans, etc. ; besides a large admixture of bits of dry dirt and stones, and also some amount of coal, iron, or large nails, and wire."

It further appears that foreign grains, and the ships which have carried them, as, for instance, those from southern Russian ports, Egypt and India, are not only dirty as regards dust and earthly products, but also contain chaff and other unwinnowed products, as well as the eggs or other stage of the insect pests which infest them. Thus a correspondent is quoted in the above mentioned Report as saying regarding barley :

"The Egyptian is the poorest. . . . It often comes full of weevils and mites, and is sometimes not so well cleaned as this sample, being more "taily" or having the tails broken off it in abundance, and sometimes particles of straw. The debris taken out of Indian wheat is the chief source of danger of carrying insect-life or spreading it. The manure of pigs fed on swill is a fruitful source of weeds afterwards."

Again—"Thus Russian can never be depended on as a basis for first-class flour. It is a pity that it is so; because if the English miller could get Russian wheat clean, America could not injure her so much by her shipments of flour." And again:

"The poverty of the growers will not allow them to use expensive cleaning machinery, while again the keen competition among shippers tends frequently to the receiving grain direct from the grower in bags, and shipping it right on by vessel, instead of, as formerly, taking their purchases into warehouse, and cleaning and mixing the various small lots into one uniform bulk. This especially applies to California, where much of the wheat, if not all, is threshed off the field and bagged at the same operation, shipped in same bags of various qualities, often full of straw, etc., and then piled on the quays and bulked in Liverpool on arrival."

And the same correspondent remarks:

"Considerable loss is often experienced by importers in this country when grain is shipped in such a dirty state; owing to the length of passage the grain becomes very warm (especially in summer time), the weevils often exist to a very serious extent, doing great injury, and causing great waste and heavy loss to importers.

"Millers in this country, with their greatly improved machinery, easily wash and clean such descriptions of grain, and are, by their practical knowledge, well able to protect their own interest in what they buy from importers, the latter running the great risk of the evil effects of weevils, etc., while in passage. Millers would much prefer having to deal with good, sound, sweet, clean grain, and pay extra prices for it.

"Shippers do not take into sufficient consideration that they pay freight and charges for such large percentage of dirt that they ship, or that they would get much better prices for their corn if they kept at home all the soil and extraneous matter alluded to."

From other observations contained in the letters quoted in Miss Ormerod's report, it appears that the unnecessarily dirty character of many of these grain cargoes has caused representations to be made by Chambers of Commerce, as at Bombay for instance, in those countries from which exports are sent, with a view to checking these admixtures of dirt and other impurities; while combinations of importers and millers have taken measures to stop such adulterations, by having grain inspectors and a scale for establishing standards of price according to the quality of a cargo, as regards impurities.

These facts have caused Miss Ormerod to remark:

"Therefore, as it appears that the absence of refuse in the corn cargoes would not injuriously affect the importers or millers, but, on the contrary, that clean cargoes would be preferred, it is allowable to draw attention, agriculturally, to the great risks that are run by purchase of what is (or in all probability may be) infested refuse, and thus in various ways allowing noxious insects, eelworms, fungi, or weeds to gain a footing."

The information which we gain from these various quotations of the modes by which the interests of English millers and agriculturists are endangered amply illustrates the position occupied by Ontario millers in relation to the duties which the growing demands of their business lay upon them, of protecting at once their own industries, and the high position which Ontario grains hold with regard not only to quality of the kernel, but also to freedom from dirt and refuse. Canada barley has long held a foremost place in the foreign market; while in the numerous quotations from letters received by Miss Ormerod from English merchants and millers, it will be seen that not a single reference is made, amongst the many countries mentioned, to Canada as being a source of impure grain.

In order, however that such a position be maintained, it is necessary to remember that increasing commerce, as increasing travel and immigration, has its attendant dangers. By the latter contagious diseases are introduced, while by the former infectious diseases of horses and cattle, weeds and parasitic diseases of plants, and insects injurious to grains obtain a foothold in countries previously free from them. We have illustrations of each of these in smallpox and cholera by immigrant ships, pleuro-pneumonia and anthrax in imported cattle, equine syphilis in imported horses, quick-grass and black-knot amongst plants and trees, and the Hessian fly, the midge, etc., amongst grains.

To protect ourselves then against such possible evils, knowledge of the dangers to be avoided, the avenues by which they approach, and the means by which they are to be opposed, is essential.

To this end the Public Health branch of the Department of Agriculture of Ontario, under instructions of the Minister, the Hon. Charles Drury, has issued this Bulletin to the millers of Ontario, informing them of the existence of an imported insect pest, known to entomologists as *Ephestia Kuhnella*, and at the same time describing its appearance and habits. In the interests of the important milling industry, the Department trusts that all millers, merchants or others will, at their earliest opportunity, supply it with any information which is likely to lead to the detection of the presence of this pest in any places at present unknown to the Department, and of any other insects whose presence is found injurious to either grain, flour or machinery. The following facts have been gathered through the investigations which have during the past six weeks been carried on with reference to the extent of prevalence, of the ravages and of the entomological characters of *Ephestia Kuhnella*.

The following statement is made by the manager of the mill in this Province in which the pest first appeared :—

"The first appearance of the *Ephestia Kuhnella*, or flour moth, that we remember seeing was during the month of March last, 1889. The moth was seen flying about near a steam pipe in the basement of the mill and near the w. c. Little attention was paid to it, as from appearance it did not indicate any danger. In April there was an appearance of a few moths on the different floors of the mill, even at the top, but still there was nothing suspicious. In the month of May we were troubled with a few worms in some of our goods, and in June more of them appeared. In July they increased rapidly, and then we began to suspect they were from the fly which we had seen in the mill during the previous months and which was steadily increasing in numbers. About the middle of July we shut down for a day or so; took the clothing from our bolting reels and washed the inside thoroughly with soft lye soap and lime. We did the same with the elevators. When we started up again every corner and part of the mill had been thoroughly cleaned, as we supposed, and we commenced to work again, but after about four days we found our bolting reels, elevators, etc., worse than before. They were literally swarming with webs, moths and worms, even inside the dark chambers of the reels. We shut down again and made a more thorough cleaning by washing, etc. While this was going on we found there was no use to try and clear ourselves of the pest as the mill walls, ceilings, cracks, crevices and every machine was completely infested with moths, cocoons and caterpillars and there was no use going on. It then occurred to us that a plague like one of the plagues of Egypt was upon us. The moth was different to any of which we had had any knowledge or experience, and we decided to apply to the Dominion Government for relief and assistance. We addressed the Government entomologist, Mr. Fletcher, and sent him samples of the moth, caterpillars, webs, etc., and received a prompt answer which considerably alarmed us. This letter was followed by others almost daily from Mr. Fletcher and a visit from Prof. Saunders on the 17th of August. Mr. Fletcher visited us also on the 27th of August; but in the meantime Mr. Blue the Assistant Minister of Agriculture for Ontario visited us and took in the whole situation. It was explained to Mr. Blue that the Dominion Government had been appealed to by us, through Mr. Fletcher, the Dominion Government entomologist, for assistance and remuneration for the loss we had sustained. Mr. Blue considering it to be a matter with which the Local Government had to do, brought Dr. Bryce, the Provincial Medical Inspector, and submitted the matter to the government for action. Afterwards Dr. Bryce and Prof. Fletcher came together and finally the whole matter was left in charge of Dr. Bryce and the Provincial Board of Health.*

*Mr. Blue communicated the appearance of the pest to the Provincial Secretary on the 25th of August, and after referring to the dangerous nature of the insect, as seen in its ravages at the infested mill, said: "I am convinced that the stamping out of the pest is a matter of very great importance to this Province, and to this end prompt and vigorous action is required. I am not clear, however, whether action in the case rests with the Local or with the Federal authorities. This is a question upon which the law officers may be consulted. If in their view the Dominion Government alone has power to act you will doubtless report the fact to the Secretary of State; but if the power and responsibility rest with the Local Government it is desirable that whatever steps may be deemed advisable in the premises should be taken forthwith." The matter was referred to the Attorney General's Department, and upon its advice an Order in Council was passed directing that the matter be "forthwith referred to a committee of three members of the Provincial Board of Health, and that these, with the Secretary of the Board, be directed to take immediate steps for the suppression of the pest, adopting such measures as may be thought advisable, pursuant to the provisions of the Public Health Act." [Ed.]

"In the meantime we took down our machinery and subjected it to steaming. Every part was thoroughly steamed. The mill was swept down and subjected to sulphur fumes. The walls, ceilings, etc., were cleaned, and elevator spouts and loose wooden work burnt up. Paper bags and hundreds of dollars worth of goods were burnt in the furnace, while the other bags, elevator belts and cups were boiled for hours in a chaldron of water. The machines and all parts that were not destroyed were then burnt by means of a kerosene torch, which flamed and smoked through and around every part of them until we considered we had everything clean and ready for putting together again.

"But on the 19th of September the Local Government passed an Order in Council compelling us to take more stringent steps, or rather ordering the Provincial Board of Health to take immediate steps for the suppression of the pest. This Act was approved of by His Honor, the Lieutenant-Governor, who signed the Order in Council, and on the 20th of September we received an order from Dr. Bryce which stated that before placing our machinery in position we should subject it to a thorough disinfecting process in a strong room so arranged that steam under pressure might be drawn or driven into it.

"In compliance with this order we at once constructed a tight steam box 6 ft. wide, 6 ft. high and 12 ft. long, and attached a steam pipe to it from the boiler. In this box we put every machine, and even our mill stones and iron rollers. This process was very expensive and took up considerable time, as we were over a week at the process and were delayed in the placing of our machinery. The Board of Health visited us in a body during the time this process was going on and pronounced it a success. This was all done not only in our own interests, as was pointed out in the letter of 20th September from Dr. Bryce, but in the interests of the public health and commerce of the country.

"Having now got to the position which enables us to go to work again after two months loss of time and the loss of machinery, fixtures, stock and expense, we have arranged for remedial measures to prevent the reappearance or destruction of the pest should we ever be again attacked. We have erected a steam standpipe with hose or other connection on each flat of the mill building. By shutting up all doors and windows of each flat and turning on the steam simultaneously to each floor the whole building can be filled with hot live steam sufficient to kill anything. This will rust all bright parts of the machinery, but to remedy this we intend using oil on them, should we ever be under the necessity of resorting to the measure.

"Another purpose of this steam standpipe will be in cold weather to let on sufficient steam to moisten everything and part of the building at night, and then throw open the windows for the night and let the frost penetrate so as to kill any eggs or insects that may have become lodged in unseen parts.

"By these measures, with plenty of light, thorough cleanliness, a cold mill, and caution in taking in stock and old bags, we hope to keep free of a pest which has given us so much trouble and loss."

What the characters are which mark the insect will be gathered from the following diagrams* and a description of it taken from Miss Ormerod's report, supplemented by statements made by Mr. J. Fletcher, Dominion Entomologist, and by our own observations together, with such other sources of information as have been available.

Miss Ormerod says: "The color of the fore wings may be generally described as of rather pale grey, with darker transverse markings, and the hind wings are peculiar for their whitish semi-transparency, with a darker line from the point along a part of the fore edge.

"On examining the infested flour early in January the mass was so completely spun together that, after pulling some lumps of it away, I found that the rest hung down in rag lumps or clots so felted together by the caterpillar's web that but little flour remained in a loose state. From a small mass of these clots, little less than two inches and a quarter, by two inches across, and half an inch deep, I could only by repeated shakings get about a teaspoonful of flour. The spun-up masses were occupied by live caterpillars, some crysalids living and dead, and remains of dead moths.

"The caterpillars varied in size from two-eighths up to five-eighths of an inch in length, and correspondingly in color, the younger ones being of flesh or pale red color,

and the largest almost white; the shape cylindrical, somewhat slender, with 16 feet, that is, three pairs of claw-feet, four pairs of sucker feet, and a very well-developed pair besides beneath the tail, by the help of which, although the largest of the larvæ were sluggish, the younger travelled nimbly, and could move backwards or forwards at pleasure, or were able to attach themselves at once to a foreign substance, as the finger or hand. The head yellowish brown, darker in front, and with dark brown jaws; a transverse patch on the segment next the head, this rather pale yellowish brown, with a faint pale central line dividing it from back to front, and (in the oldest specimen) a small brown spot on each side of the segment below the patch. Along the back, excepting towards the head and tail, were four small dark dots on each segment, above, two on each side the centre. On the segments near the head the spots were arranged more transversely, and at the tail, immediately above the sucker-feet, was a brownish, oval or somewhat triangular patch (the anal plate). On the preceding segment one transverse row of spots varied somewhat in different specimens; the largest was in the middle, with a smaller one on each side, occasionally one below, which would make five altogether; but sometimes the lowest pair was absent, sometimes the middle large spot was not entire; conjecturally the marking differed with the age of the caterpillar. On the preceding, that is, the eleventh segment, there were two clearly-defined brownish spots, and along each side of the caterpillar was a row of dark dots, one on each segment.

"The caterpillar was slightly sprinkled with pale hairs or fine bristles, and had such a capacity for catching and retaining a covering of flour that I was obliged perpetually to remove it with the moistened tip of a finger to obtain a clear view of the markings.

"The chrysalis, which was lying in a silken cocoon of spun-up flour, showed the chief points of the form of the coming insect plainly—the color bees-wax below, shading to reddish brown on the back, and reddish brown also at the end of the somewhat prolonged, slightly-curved tail, which ended bluntly or cylindrically; the eyes of a darker shade of red. There were remains of dead, partly-developed moths or chrysalids in the box, but I could not make sure whether, as thought not unlikely by Prof. Zeller, these had been destroyed by their caterpillar brethren—the size and power of their jaws make the cannibal habit appear very probable. I had not opportunity of observing how long the chrysalis state lasts before the moth appears from the chrysalis condition, but this time is given by Prof. Zeller as three weeks.

"The attack may be considered as going on constantly where temperature is suitable, for we have notes of appearance of the moths in May, June, July, November, and December; and intermediate observations of larval or pupal presence point to this, which, when once established, is indeed a mill or flour scourge, as being a year-round pest."

In order that these descriptions may be more intelligible to the reader unfamiliar with the life-history of insects, it may be said that insects undergo in their development, from the egg to the adult or completed state, a series of transformations. This series begins with the hatching of a minute egg (of which the adult insect, in this case a moth, lays—it may be a hundred or more), incased in a hard outer-covering or shell. The egg-shell having thinned and burst, the larva or grub stage succeeds. The larvæ of butterflies and moths are called caterpillars. As soon as hatched the larva feeds voraciously, and grows rapidly on the kind of food peculiar to it—in this case starchy foods, as the flour of rice, cassava, tapioca, Indian corn, as well as those flours and grains containing large amounts of gluten, as wheaten flour, oatmeal and barley-meal. During this stage the caterpillar stores up fat, out of which the tissues of the new body of the pupa and imago (cocoon or moth) are to be formed. Larvæ moult or change their skin four or five times, notably in the case of active species. A few days before the pupa stage succeeds the larva becomes restless, stops eating, and deserts its food, and usually spins a silken cocoon, or makes one of earth, chips or (in this case) of flour, in which the caterpillar is enveloped. This larval stage is that in which *E. kuhniella* becomes most troublesome to millers, as so well described by Miss Ormerod and the correspondent in whose mill it has been so prevalent in this country. The pupa or quiescent stage lasts for weeks or months, according to the species of insect and the temperature in which it lives. When the stage is short, as has been found to be the case with *E. kuhniella*, the

multiplication of individuals becomes very rapid, as is unfortunately too well illustrated in the statement of the correspondent already given.

When the pupa stage is completed, this dull chrysalid breaks its envelope and the mature winged insect goes forth. After completing its development the sexes meet, and fertilization of the female having taken place the male soon perishes, and the female lays its eggs in the food intended for the nourishment of the larva when hatched out from the egg.

From the foregoing it will be apparent that the moth may not only be transported from one place to another in any one of its various stages, but that search for its presence in any one or all of these must be made where its presence is suspected. It will at once be seen how great are not only the dangers of its transmission from one mill to another and one locality to another, but also how many are the difficulties attaching to its detection, while as yet only a few individuals may have been introduced into a warehouse or mill. With what rapidity the *Ephestia Kuhnella* develops under favorable conditions nothing will better illustrate than the correspondence from a sufferer therefrom already published. When it is stated that a large warehouse, some 25 feet wide, 75 feet long and four storeys high, became literally alive with moths in the short course of six months, while thousands upon thousands of the cocoons were found adherent to the walls, joists, posts, ceilings, and in every nail-hole, cracks in floors, partitions, machinery, furniture, throughout the whole building; while in sample-boxes of card-board, in small and large bags, in flour stored anywhere throughout the building, it was abundantly present, it will be understood what millers have to expect to encounter if they neglect the most vigorous measures to destroy the first moths which at any future time may appear on their premises. To illustrate further the difficulty of overcoming the pest, once introduced, it may be stated that several men have been at work in the building, from which our correspondent has removed his machinery, for over a fortnight in burning all woodwork, as flooring, fixtures, etc., sweeping down walls and destroying the rubbish, the walls thereafter having to be washed down and the floors scrubbed with disinfectants, while during the process many pounds of sulphur have been burned in order that the fumes may aid in the work of destruction.

We may now refer to the measures necessary for preventing its introduction at any future time into Canada, and for the suppression of this pest where now existing in this Province.

1st. The foreign source of the pest must be remembered. Klein calls it the pest of the Mediterranean, and that this is so seems proved from the fact that the almost certain avenue of its introduction to this Province was in milled goods, imported as children's foods, consisting of Italian semolina, Indian cassava and Brazilian tapioca. It seems an essential, if we are going to avoid danger from this source, that no goods or bags be allowed to enter Canada from Mediterranean ports unless they are first quarantined in a warm place, for a number of months, thereby giving the ova, if present in them, an opportunity to hatch out.

2nd. All bags which have already been used for transporting grain, flour or meal should be prevented entry into Canada unless subjected, under inspection, to thorough boiling or superheated steam. This, probably, is of all dangers the greatest, and one which the Dominion Government could carry out without any unpleasant delay or loss being the result.

3rd. Every miller in Canada, but especially those engaged in export and import trade, should make himself thoroughly acquainted with the appearances and characters of the moth at its various stages, and take means to at once destroy any individuals before they have had time to multiply. In this case a little prevention is worth many hundred times the same amount of cure. They may further facilitate the work of prevention by informing this Department at once of any outbreak and of the avenue by which the pest has entered. But assuming the pest to have been introduced, there are a number of points to be attended to.

(1) Destroy the moths. This can be done by closing the windows, doors or other apertures of the building, and, night after night until all evidences of moths have disap-

peared, burn sulphur by placing it in shallow pans upon a number of heated stoves, say small coal oil stoves, in different parts of the building, and putting a match to it. *The note below describes another convenient mode of creating sulphur dioxide fumes.

(2) Search for evidences of the larva or caterpillar in all packages, bags, etc., of flour and meal, and, wherever found, at once superheat the flour in a dry kiln. Spread it out in a thin layer so that the heat can reach it and the packages, boxes, etc., containing it.

(3) Under no circumstances sell this material to other dealers, whether to mills or produce stores, but have it treated with boiling water or steamed and fed to pigs.†

(4) Where webs have appeared, either in the packages of meal and flour, in the bolting-cloths and carriers, or in deposits of dust on ledges, along the walls, etc., it may be deemed certain that the larva has taken on the chrysalis stage. Hence it becomes necessary to make a close search in all these places for the cocoons or little masses of flour glued together, of say three-quarters of an inch in length. These swept down can readily be gathered up and burned.

It has, however, been already pointed out that owing to the habit which the larva has of retiring to some crevice, when not hidden in a package or deposit of flour, before passing into the chrysalis stage, we find them in innumerable places quite impossible to be reached by any brushing down process.

Two ways then only are left for overcoming this difficulty. The one that first suggests itself is that of waiting till the chrysalis is burst and the moth appears and then to kill the moth.

This, doubtless, may be followed with good results, i. e., have the first moths appearing destroyed by hand and by subjecting the affected portions of a mill or building to repeated treatment with the fumes of burning sulphur every night when the works stop. If this be persistently followed out but little development of new forms will take place. It must be remembered that this work must be persistent and thorough, abundance of sulphur burnt again and again being the sufficient condition of success.

Where, however, the larvæ have as it were gained possession of bolting-cloths and carriers treatment with steam under pressure driven throughout all parts of the bolting-cloths, carriers and other machinery has been found very useful in lessening the inconvenience from the spinning of webs and thereby the clogging of the machinery. The walls, floors and ceilings may further be treated with advantage by first brushing down all dust and thereafter spraying them with a solution consisting of a drachm of corrosive sublimate to each gallon of water, by means of a gardener's force pump. Treatment with fumes from burning sulphur while parts are yet moist from this washing down will greatly aid in the destruction of any larvæ or cocoon forms which may be reached.

* To prepare sulphur fumes: Place a metallic dish containing hot ashes on some support in a pan of water, or place in an old pan or other vessel a bed of ashes at least six inches deep and about 15 inches in diameter and place the sulphur and saltpetre in a slight depression in the centre and ignite. The proper proportions are 3 lbs. of sulphur and 3 oz. of saltpetre per 1,000 cubic feet of air space. All doors, windows, and other openings should be tightly closed before the sulphur and saltpetre are ignited.

† (1) Any medical health officer or sanitary inspector may, at all reasonable times, inspect or examine any animal, carcase, meat, poultry, game, flesh, fish, fruit, vegetables, grain, bread, flour or milk exposed for sale, or deposited in any place for the purpose of sale, or for preparation for sale, and intended for food for man; the proof that the same was not exposed or deposited for any such purpose, or was not intended for food for man, resting with the party charged; and if any such animal, carcase, meat, poultry, game, flesh, fish, fruit, vegetables, grain, bread, flour or milk appears to such medical officer or inspector to be diseased, or unsound, or unwholesome, or unfit for food for man, he may seize and carry away the same, or cause to be seized and carried away, in order that he may cause it to be destroyed or so disposed of as to prevent it from being exposed for sale or used for food for man.

(2) The person to whom the same belongs, or did belong at the time of exposure for sale, or in whose possession or on whose premises the same was found, shall be liable to a penalty not exceeding \$100 for every animal, carcase, or fish, or piece of meat, flesh or fish, or any poultry or game, or for the parcel of fruit, vegetables, grain, bread or flour, or for the milk so condemned; or, at the discretion of the convicting justices or magistrate, without the infliction of a fine, to imprisonment for a term of not more than three months. 47 V., c. 38, s. 39.

Chlorine fumes may be used with equal benefit under those conditions where burning sulphur may create an added element of danger from fire.* In place of the corrosive sublimate solution, the following solution taken from the report of the Dominion Entomologist, James Fletcher, F. R. S. C., for 1885, is recommended:—

"*Soap Emulsion*.—An emulsion may also be made with soap. The most satisfactory formula, as given by Prof. Riley, is as follows:—

| | |
|-------------------------------------|----------------------|
| Kerosene..... | 2 gallons. |
| Water..... | 1 do |
| Common soap, or whale-oil soap..... | $\frac{1}{2}$ pound. |

"Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force-pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling, and should adhere, without oiliness, to the surface of glass. Dilute before using, 1 part of the emulsion with 9 parts of cold water. The above formula gives three gallons of emulsion, and makes, when diluted, 30 gallons of wash. The kerosene and soap mixture, especially when the latter is warmed, forms, upon very moderate agitation, an apparent union; but the mixture is not stable, and separates on standing or when cooled or diluted with the addition of water. A proper emulsion of kerosene is obtained only upon violent agitation. It is formed not gradually, but suddenly. The temperature should not be much above blood heat. Prof. Riley lays great stress upon the fact that all who use kerosene as an insecticide must bear in mind that it is only a safe remedy when properly emulsified, and he maintains that all failures have resulted from carelessness in making the emulsion."

We have detailed at some length the history of the introduction and spread of a pest so serious as to cause alarm to all millers who have unfortunately had any experience with it, or seen the conditions existing where the moth had been introduced even for only a few months. We have illustrated the appearance of the insect, have given in detail its habits at different stages of its life-history, and the methods which have been adopted by ourselves or others for dealing with it at its various stages, and have indicated the results obtained up to the time of writing. But much more is to be done. We cannot yet be sure that it has wholly disappeared from those centres where its presence is known; and it is only too possible that it has made its appearance in other mills and produce stores where its limited prevalence and ignorance of its character have caused it to be overlooked. For assistance in discovering the latter we depend upon the intelligent observation of those most interested—the millers and produce men; for dealing with it in places where already known or yet to be discovered we promise such practical assistance as the great interests at stake demand and the means at our disposal make possible. Such are some of the principal matters which have occupied the attention of the Board during the year. Notable progress in the various departments of the work are apparent, but especially in the field of scientific investigations and executive work in the setting in motion the machinery of the Act for stamping out disease and removal of sanitary evils. There remains a felt need in the facilities necessary for obtaining regular and systematized information regarding outbreaks of disease and deaths arising therefrom. It is to be hoped that in conjunction with the Dominion and other Provinces a comprehensive scheme will be shortly elaborated whereby Provincial Boards will be able to obtain such statistics at such early times as will enable it to take prompt action towards limiting and suppressing even localized outbreaks.

Trusting that my report will commend itself to the Board.

I have the honor to be,
Your obedient servant,

PETER H. BRYCE,
Secretary.

* To prepare chlorine fumes: Mix in a glazed dish and place on a stove or other heating surface, peroxide of manganese, 1 part; sulphuric acid, 2; chloride of sodium, 3; water, 2; or more easily by mixing 3 lbs. of chloride of lime and 3 lbs. of hydrochloric acid for every 1,000 cubic feet of space.



SPECIAL REPORTS

BY

COMMITTEES OF THE BOARD.

REPORT ON THE OUTBREAK OF SMALLPOX IN ELGIN COUNTY.

GENTLEMEN,—Being informed by telegraph of the fact that smallpox was spreading in Southwold and adjoining townships of Elgin I visited the city of St. Thomas on March 2nd, and having met the Local Board and discussed the situation, I proceeded the next morning to Fingal, having on the way called upon Mr. Casey, M.P. for Elgin. I found the following condition of affairs:

Public places, as skating rink, churches and school had been closed; sales had been postponed; the people exposed to the disease at the Eustace house were under surveillance. No sanitary inspectors however, were actually appointed, although members of the Local Board were doing what they could, and the medical health officer appointed had resigned, and a man had come to an infected house to act as nurse from St. Thomas, and was acting without being under any regulations of the Board. Cases springing from the Southwold case existed in London city and adjoining townships.

Some difficulty had been experienced by the Board in finding a physician to attend to the cases. The local physicians who had had a certain amount of odium cast upon them owing to the fact of their having failed to recognize smallpox in the several first cases, were not employed to attend the cases. Some days previous to my visit Dr. McLay, of Aylmer, had been employed by the Board, owing to his reputed experience with the disease. I met this gentleman and learned from him that he had been seeing cases for several days. As I was not fully satisfied that the organization was as complete as was desirable, I visited Shedden, and having met Dr. J. H. Howell, who had been acting as a public vaccinator for the Board, I pressed him to accept the position of medical health officer. Thereafter we visited the reeve and met several members of the Board all of whom had been doing their utmost to limit the spread of the disease by preventing persons from infected houses going abroad, it not having been up to this time found possible to get men to act as sanitary inspectors or police.

The council appointed Dr. Howells medical health officer the next day, and on my return to St. Thomas I requested the Local Board there to obtain if possible men who could be depended upon, to act as sanitary police for the township. On my return to Toronto, I succeeded in obtaining the services of a person who had previously acted as a sanitary policeman under this Board, for the work of the Local Board of Southwold. While it is regrettable that so many cases have occurred from this outbreak, there having been in all 43 cases and 12 deaths, yet it must be remembered that it was not more than a fortnight before the time of my visit that the Local Board had had any knowledge of the outbreak being smallpox, and that at the time of my visit there had been 26 cases resulting from the outbreak and 7 deaths. Being unable through illness to go a week before my visit, Dr. McKay, Woodstock, at my request went to Fingal and found the Local Board becoming organized and doing all they could to stop the disease. The chairman and secretary of the township Board had indeed been constantly engaged at the work, to them new, of health officers, and showed a zeal for their work and for the public health worthy of the highest praise.

On my return the next day to St. Thomas, a meeting of the Local Board and council had been called, and heard my report regarding the state of affairs in Southwold, which is adjacent to the city. Dr. Van Buskirk had been appointed to assist Dr. Tweedale the medical health officer in doing public vaccinations, and investigating all suspected cases; and sanitary police had been placed on all the roads for challenging persons coming from the infected districts. The Compulsory Vaccination Act was at my request enforced, and free vaccination thereafter ordered to be carried on. The site of a proposed new hospital was subsequently visited with the Board and a committee of the council, and the old building not being deemed satisfactory, the committee at once ordered the town architect to proceed with the plan of an isolation hospital which was completed in a few days.

Subsequent to my visit 17 cases occurred, but all in persons belonging to the families already infected. While this number might have been much lessened by prompt vaccination in those instances where cases had occurred in any house, yet the Local Board did as much under the circumstances as they could, and cannot be held accountable for the neglect of that part of the work having a more technical character.

The whole work of disinfection has now been carried out to the satisfaction of the medical health officer. The lesson has been a costly one to the municipality, but if by it Southwold and municipalities generally should learn that systematic vaccination year by year is the only safeguard (since it appears that early diagnosis and isolation of first cases cannot always be depended upon), then the lesson will not have been taught in vain.

P. H. BRYCE.

The following report of Dr. J. H. Howell, Medical Health Officer, appointed at the date indicated above, gives the chief details connected with the outbreak in Southwold :

To the Secretary of the Provincial Board of Health :

DEAR SIR,—During the latter part of January the disease made its first appearance at Fingal. Two children, both members of one family, were the first cases affected. Members of the family had been previously living in Buffalo, and as smallpox was quite prevalent there at that time, they undoubtedly brought it with them in some way. It was pronounced chickenpox by the attending physician, and as both made good recoveries but little attention was paid to it. A couple of weeks later a woman living across the street, who had been in frequently to see the children, was stricken down with it and died in a few days. Shortly after another woman took it and also died. And a little later the father-in-law of the first woman contracted the disease and died.

Up to this time (the latter part of February) it had been pronounced malignant chicken-pox by the two local physicians, and no precautions whatever had been taken against the spread of the disease, which had now broken out in two or three fresh places. Public funerals had been held of those who had died, and a largely attended dance had been given about the middle of February at the house where the two children were recovering from the disease.

As matters were now looking serious a meeting of the Board of Health was called on February 21st, and three doctors from St. Thomas were asked to see the cases, and all agreed that it was undoubtedly smallpox of a severe type. The people were almost panic-stricken at the news. Fresh cases were breaking out in every direction, and as so many had been exposed to the disease it was not known where it would end. Active measures were at once taken by the Board to prevent any further spread. Public vaccination was commenced and all the infected houses and those who were known to have been exposed were at once quarantined. People were so badly frightened that it was next to impossible to secure attendance on the sick, and great difficulty was experienced in getting the necessary supplies from the neighboring town. The Board, notably the chairman and secretary, labored day and night to secure proper attendance, and to check the spread of the disease. Dr. McLay, of Aylmer, was engaged to attend the patients who were scattered over different parts of the township. There was no medical health officer, but on the advice of Dr. Bryce, who visited the scene on March 2rd, one was appointed. The epidemic was soon under control, and the last death occurred on March 12th, and a couple of weeks later the last case had been reported.

The disease broke out in thirteen houses in the municipality. Forty-three cases were reported, and of these twelve died, giving a death-rate of twenty-eight per cent. Of those who died none had ever been vaccinated, with possibly one exception. Eleven of those who had recovered had never been vaccinated, which gives a death-rate of fifty-two per cent. among the unvaccinated. The remaining twenty had either been vaccinated or inoculated, and all had the mild type of the disease. A noteworthy fact in connection with the epidemic is that after the Board of Health commenced their efforts to stamp out the disease, no cases developed except among those who had been previously exposed and their families. Thorough disinfection, vaccination, and efficient quarantine were the measures which cut short an epidemic which had a start of six weeks and had been allowed every chance to spread.

Quarantine was raised from the last house on the eighth day of May.

Yours truly,

J. H. HOWELL,

Shedden, Sept. 21st, 1889.

Medical Health Officer, Southwold Township.

REPORT OF THE COMMITTEE ON EPIDEMICS *RE* AN OUTBREAK OF DISEASE AT SANDFORD, NEAR UXBRIDGE, AMONGST HORSES.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN,—A few days ago the Department of Agriculture was informed that a sudden and terribly fatal outbreak of disease had occurred near Sandford, amongst the horses of Mr. Thos. Burnham, and that it was pronounced to be epizootic cerebro-spinal meningitis, by the veterinarians. I proceeded at the request of the Department to investigate the same. The following are the principal facts:

On Tuesday, 7th May, the first horse was noticed sick at 6 a. m., died at 12 a. m., aged 5 years.

2nd horse took sick in going to Mt. Albert, died Tuesday morning, 7 years.

3rd horse took sick, died 7 a. m., Wednesday, 4 years.

4th horse, yearling, sick Thursday, died Friday.

5th horse, sick on Saturday, 11 a. m.

The symptoms as described, left little doubt but that the cases were those of some septicaemic poison, the intensity of whose effects made themselves felt in the cerebral and spinal centres, as paralysis rapidly intervened, with in most cases marked comia, ending fatally. These horses had apparently been perfectly well on the preceding Monday, the 6th. There had been no similar cases in the neighborhood recently, and assuming the cause to be local, search was instituted. Rain water in three large cisterns is used for watering the animals. The one in the stable where the horses were was the oldest and was used for wetting the cut hay and meal in the horses' mangers. It had not been recently cleaned out, but was well made, lined with cement and covered with planks which were somewhat decayed and covered with fungoid growth. The stables were good, but the deeper part of the mangers had been blocked; but these were in fact loosened and the soakage from the food had caused some decay. The other cisterns were new, and had not probably been used for these horses.

The question arises, was the disease due to either of these sources, whereby by saprogenic products were introduced either into the food, or by emanations introduced into the air passages.

Regarding the nature of the disease, there can be little doubt but that its affinities are those belonging to an epizootic which, appearing in 1871 on this continent, caused great havoc amongst horses, and which prevailed in the provinces and states bordering on the great lakes to an epidemic degree amongst children. Whether again the disease so suddenly developed might be classed with those which like diphtheria are associated with decaying products, may well be considered. A constant symptom with these horses was an inability to swallow, and although they would nibble, they simply made a "cud" or mass in the mouth, which would be allowed to drop out. They were first dull, pulse was weak and rather slow, and the mucous membrane of the nose seemed pale. Complete isolation in different fields was ordered for the two remaining horses, one of which was sick and likely to die. I insisted on having the stables completely cleansed, especially the mangers, and to be kept vacant for several weeks and well aerated, and the cisterns to be emptied, lime-washed, and to be covered with metal or other substance than wood. Samples of water were taken from the wells, and, were facilities at hand, a biological study of those and the decomposing products in the mangers, would doubtless have been productive of good. Referring to past outbreaks, I find that an epidemic of it is reported in Jackson, Michigan, in 1881 in children, marked invariably by sore throat, also an intensely painful catarrhal inflammation of the schneiderian membrane, with offensive discharges. Some continued with complete cerebro-spinal paralysis, lasting at times 24 hours, some with convulsions. An early prevalence of diarrhoea, etc., June 16th, was associated with an exacerbation of cerebro-spinal meningitis. The subject deserves, however, a much more careful enquiry than has been possible.

Yours truly,

P. H. BRYCE,
Secretary.

 REPORT ON METHODS OF SEWAGE DISPOSAL IN ENGLAND.

To the Members of the Provincial Board of Health :

GENTLEMEN.—In consequence of the protracted illness of a near relative whilst in England I was not able to attend to the trust reposed in me at the May meeting of our Board, viz., that of acting as their representative at the Congress of Hygiene assembled in Paris during the time of the National Exposition, as also of the meeting of the British Medical Association this year convened at Leeds, Yorkshire. For the acquisition of a knowledge of the procedures of the Congress at Paris, I put myself in communication with Monsieur Masson, the Secretary of the Bureau d' Assainissement, and by him was informed that on payment of the fee required from all delegates the daily agenda papers and the final report would be supplied to our Board. This information I transmitted to Dr. Bryce with a request that he would forward to the gentleman named, whose address in Paris I communicated the required amount, viz., twenty francs. Any imperfection in the complete records of the Paris convention will, I am well assured be supplied in the report that our friend Dr. Ranch, Secretary of the Illinois State Board of Health, will furnish at the approaching convention of the American Public Health Association this year, appointed to meet at Brooklyn, New York. For the papers, discussions and reports of the Leeds meeting, I wrote to a nephew a long resident and well known practitioner in that city, enclosing him my credentials, and requesting him to report to the chairman of the State medicine section the cause of my absence and to solicit for our Board any particulars of the session that might not appear in the *British Medical Journal*, or in the daily newspapers of the city. To this application I received a prompt answer from my nephew to the effect that he would forward to Dr. Bryce all the information required. In compliance with a request made in a letter received from our secretary early in July, I endeavored to obtain for our Board information as to cost of the necessary plant for the complete fitting up of a bacteriological laboratory, as also reports of the different modes of procedure adopted in the different cities and towns of England for the disposal and purification of sewage. For procuring this desired knowledge I visited Drs. Buchanan and Thorne Thorne, the President and Vice-President of the Local Government Board, Whitehall, and from the latter obtained a list of eight towns, viz., Acton, Hendon, Friern-Barnet, Oxford, Doncaster, Croydon, Reading and Cheswick, where it was represented to me that valuable information could be obtained. To the medical health officers of all these towns I addressed letters, but up to the time of leaving England for Canada, I was in receipt of answers with accompanying reports from only three, viz., Friern-Barnet, Oxford and Reading, the same now submitted.

To commence with the information sought for *re* bacteriological laboratory. In the latter end of July, I received an invitation from Dr. Tett, one of the physicians of Guy's hospital, to lunch with him and a kind intimation that he would take me to the hospital and introduce me to Dr. Washburn, the professor of bacteriology at Guy's, who would furnish me with the required information regarding the cost of fitting up a laboratory. By this gentleman I was most courteously received, taken through the various rooms in use for his laboratory and also shewn a copy of the bill of cost of furnishing, less than thirty pounds, also a kind promise that whenever our Board resolved on fitting up one he would obtain for us the same appliances that he found to be all that was necessary, from the very best makers at the prices charged for Guy's hospital laboratory. A list of these charges I enclosed to Dr. Bryce a few days after their receipt. From the three towns above mentioned, from the respective medical health officers I received replies from, I selected Friern-Barnet as the most accessible. This town has at present a population only of eight thousand, but will as a suburb of London, in all probability, rapidly increase. Dr. Hugh Stott, the energetic medical health officer informed me that he had in the past, frequently occasion to report on as being in a condition dangerous to public health, and that the same must continue if the then existing method of disposing of the sewage by cesspools was depended on. Until within a few years there were no sewers and all temporary measures had failed on account of unsuitable ground for intermittent filtration. On the 8th of August I drove over to Dr. Stott's health office by appointment some seven miles distant from my residence, and was by this gentleman most courteously

received, and for more than an hour and a half was occupied in a survey of the works, Dr. Stott minutely explaining to me the *modus operandi*. I regret now that I did not take notes at the time, as from recollection only some of the details may be omitted. I may commence by stating that the cost of the works and the sewerage of the town amounted to forty thousand pounds, the annual cost of working three hundred pounds, and taxes levied seven shillings in the pound. The sewage on reaching the works passed from the outfall of main sewer into a large well in which is slowly revolving a large and broad wheel, the entire outside of which is covered with a fine wire netting which intercepts the coarse matter likely to choke or injure the pumps. The sewage thus strained is caught in cups placed on opposite side of wheel and from these with every turn the sewage passes through a culvert to a pump well under the main building, then raised by centrifugal pumps to the surface where it receives a large charge of lime and alum, is thence by the action of the pumps discharged into a meter chamber where the sewage is measured and quantity registered. On leaving the meter the sewage flows along open conduits exposed to oxidation by atmosphere to successive settling beds which have at the bottom a thick layer of charcoal precipitating the solids as it flows; passing from one filtering bed to another and from the last the clear effluent passes into a narrow stream which also receives the effluent from Colney Hatch lunatic asylum, the principle of separation there adopted being intermittent irrigation of the grounds attached to the institution. This effluent from the Friern-Barnet works we tested with Nessler's solution which almost immediately produced an orange colour, proving that it was not entirely free from ammonia. This, as far as I remember, Dr. Stott accounted for by the fact of continued heavy rains having interfered with the usual frequent removal of the sludge from the bottom of settling beds. This sludge I may state has but little market value even in England. I now pass on to a more recent system of disposing of sewage, namely by electrolysis:

Whilst on a visit to my brother-in-law, Dr. Hutchens Williams, of Lee, County of Kent, I learnt that Mr. W. Webster, F.C.S., had for a long time been carrying out long and exhaustive series of experiment at Crossness for the purification of sewage by electrolysis, and that he was a resident of Lee, I therefore, on the 25th of July, addressed a letter to him in which I stated that I had been requested by our Provincial Board of Health to give as much attention to the question of the disposal and purification of sewage as my time would permit during my visit to England, and that as I had been informed that the opinions of the press generally have been most favourable of the electrical method for the purification of sewage at the main drainage outfall at Crossness, I would take it as a favour if he would kindly furnish me with a report. Two days after I received from him the following notes from which I extract the chief points:

The dynamo is an Edison-Hopkinson, capable of developing an energy of 43 h.p. From the dynamo the laedrun through resistance frames by means of which the amount of current can be regulated without varying the speed of the engine. These are then connected with the iron electrodes in both the precipitating tanks and the shoots. The precipitating tanks are used for taking experimental measurements so as to discover the best mode of arranging the electrodes, hereinafter called plates, made of cast-iron, run direct from blast furnaces. The shoot is fitted with wrought-iron plates, more convenient for experimental work as they are thinner and weigh less than if made of cast iron. The shoot is of wood, but in any permanent works it would be built of concrete, bricks or iron, and the bottom would be lined with asphalt or other suitable material. The sewage is discharged into the shoot from the pump connected with the main sewer. The shoot is fitted with plates as shown in the accompanying drawing. In travelling along the shoot every particle of the sewage comes in contact with the plates, and finally the whole is received into one or other of the settling tanks. The plates in this shoot are divided into twelve sections. All the plates in each section are connected in parallel, and the sections can be connected either in parallel or in series as may be most convenient.

I find it best to run them arranged as six sections in series, as owing to the low tension of the dynamo it is inconvenient to split them up into a greater number. The dynamo should be near the centre of the shoot, and practice has proved that it must be so constructed that as many sets of plates as possible may be arranged in series, but the space at my command in these works does not admit of the most effective arrangement being adopted. My experiments prove that with 27 h.p. it is possible to treat one million gallons of sewage in twenty-four hours. These figures relate to average London sewage. As to cost of engine power, the newest type of engines suitable for driving dynamos may be taken to consume two pounds of coal per h.p., hour, and according to the price of the coal will be the working cost. The experiments carried out with reference to the amount of iron consumed by this process tend to prove that the consumption in continuous working should not be more than two grains per gallon. Here again, the cost depends entirely upon the position of the works, or more properly speaking, the district in which the works are situated. The plates of pig-iron, are one inch thick and if used in sufficient numbers would last for many years when once fixed. For instance, I will take a town with a flow of ten million gallons of sewage

per day, corresponding to a population of thirty thousand, at thirty gallons per head. To treat this amount of sewage the consumption of iron should not exceed four hundred and sixty-four tons per annum. On calculating the amount of mechanical power required per head of the population, I find it represents 1-1,225 of a h.p. or 8 h.p. per 1,000.

It will be seen that the above plant is practically in lieu of the mixing tanks, machinery, and chemicals employed in the chemical process for the treatment of sewage, and if such electrical plant is designed to meet the peculiar requirements of any particular district it must, in my opinion, cost less, and have a greater efficiency than any other process known, for not only does this electrical method precipitate the matters in suspension, but it also removes organic matter in solution and forms a precipitating and disinfecting process in one operation. The cause of any successful precipitation of suspended matter in sewage is entirely due to the formation of flocculent particles by means of chemical action. In the ordinary processes used this is obtained by the introduction of chemicals in a liquid form, and a large amount per gallon of sewage must be used to produce the necessary flocculency. Electrolysis with oxydised plates produces this effect, with a consumption of material ranging from one grain per gallon, and the stronger the sewage the less the power required to produce the effect. The action that takes place manufactures the necessary precipitating agent in the sewage, whereas, precipitation with solutions of chemicals means a consumption of several grains per gallon of the sewage, if the action is intended to cause an adequate deposition of matters in suspension, and the resulting effluent requires further treatment with some oxidizing agent to remove the organic matter in solution. With my electrolytic process, at the same time that the precipitation of the suspended matter is taking place, the organic matter in solution is being oxydised by means of free nascent chlorine and oxygen given off at the positive plate. I may here mention, gentlemen, that in a letter I received from Mr. Webster at the same time as the above notes, this gentleman mentioned that the increased prices of coal and iron since the notes were issued would have to be considered. I now proceed to the very important endorsement of the system of Mr. Webster's that is to be found in the *London Times*, of the 1st of April, of the present year; in the *Engineer*, of the 29th of March, 1889; in *Engineering* of same date; in *The Electrician*, same date; in *Electrical Engineer* same date; in *Iron* same date; in *Industries* same date; in *Pall Mall Gazette* same date; in journal of gas lighting, water supply and sundry improvements, April 2nd, 1889; in *Standard*, 7th January, 1888. The articles in the above quoted journals I now submit *in extenso* to the members of the Board, but as it is probable that our Toronto newspapers could hardly spare the space requisite for the full report, I have thought it better to make such a condensation as would be suitable for the room in their columns. *Times*, 1st April, 1889: "Mr. Webster's process is intended to take the place of the purification of sewage by chemicals involving three processes, precipitation oxidation, and disinfection attended with the disadvantage, that if two many chemicals are used fermentation in the river may take place. The principle of the electrolytic system is that the compounds always present in sewage are split up into their constituent parts by the electric current passed through iron electrodes. At the positive plate chlorine and oxygen are set free and combine with the water and the iron plate to form acids which add powerfully upon the organic matter. A flocculent precipitate of the impurities in suspension and in solution is formed, which after being first carried to the surface by the hydrogen generated, gradually settles to the bottom leaving a perfectly innocuous effluent. The effluent can, indeed, if sufficient electric power be used, be converted into an absolute disinfectant. The plant set up by Mr. Webster, at his own expense, for the purpose of experiment, consists of an engine of 20 h.p. and dynamo capable of developing 43 h.p., together with a wooden shoot fitted with iron electrodes. The sewage is pumped by the engine (which also drives the dynamo) into the shoot, and in travelling along it (shoot) every particle of the sewage is brought into direct contact with the plates or electrodes. The fluid passes from the shoot to the tanks, where the precipitate of suspended matter or sludge, as it is termed, settles at the bottom in about two hours, the effluent being afterwards drained off. The electrodes are made of cast iron and those in the shoot are divided into twelve sections, which can be connected either in series or in parallel. When once the necessary plant which can be adapted to any existing tanks, has been set up, the only outlay involved by the process beyond the ordinary working expenses, is in the renewal of the positive electrodes, for these are acted upon by the acids formed. It is calculated that to treat a flow of ten million gallons of sewage a day the consumption of iron should not exceed four hundred and seventy tons per annum, while the mechanical power required would be 8 h.p. per three hundred thousand gallons. These calculations based on London sewage, which is often diluted with rain-water. But where the sewage is stronger, the power employed need not be so great, because the chlorides which form the precipitating agency would be present in greater proportion to the volume. It is estimated that the working cost of the electrolytic process when applied to a large volume of sewage, would be about thirteen shillings per million gallons and that the whole sewage of London might be treated for about thirty-six thousand pounds a year. Taking into account depreciation of plant, interest on capital, etc., the amount would probably be within fifty thousand pounds.

Description of the electrical method of disposing of sewage by Mr. Wm. Webster, in the *Engineer*, much the same as given in *London Times*, estimated in parts per 100,000 the suspended matter is reduced from 33.35 to 1.56; nitrogen as free ammonia is reduced from 4.34 to 3.22 and albuminoid matter from 0.5 to 0.2; chlorine as chlorides becomes 18.62 instead of 21.64, and the oxygen required to oxidise the organic matter becomes 0.52 instead of 1.24. A sample of raw sewage very turbid and opalescent, and with a bad odour, yielded a clear effluent without odour. The sewage contained 14.52 parts of suspended matter, 5.95 being mineral and 87 organic. In the effluent these quantities become respectively 1.48, 1.05 and 0.43; the free ammonia declined from 3.57 to 2.9, the albuminoid matter from 0.6 to 0.28 and the chlorine as chlorides from 14.61 to 13.39. The oxygen required to oxidise the organic matter was 4.03 in respect to the sewage compared with 1.34 for the effluent. Dr. Thudicum, who was present, said he was induced from what he had seen to look upon the process with the utmost hope; if Mr. Webster succeeded as he trusted he would, the process would open up a new era in the history of the sewage question."

Engineering, at the conclusion of a long and favourable notice of Mr. Webster's electrolytic system says: "There is a charming simplicity about Mr. Webster's process. He manufactures his chemicals to a great extent out of the sewage itself, and he uses them in the nascent state when it is well known they are most powerful. Instead of adding 5, 10, 12 or 15 grains per gallon of solid matter, as is now done, he only adds two, and he not only precipitates the matter in suspension, but he also removes some of the organic matter in solution. This latter is an important matter, as it defers the second decomposition so long that the effluent may be carried down to the sea, or oxydised by natural influences, before it can occur.

The extent to which the purification can be carried is merely a matter of time, and in hot weather when the quantity of sewage is reduced and is consequently fouler, it can be allowed to remain for a longer period in the electrolytic bath."

Electrician, of 29th of March, 1889, says :

"On Wednesday last, when the representatives of the technical journals visited the outfall works of the Metropolitan Sewage Works, at Crossness, where Mr. Webster has had an experimental plant in operation for nine months, we first witnessed some laboratory experiments on a small scale designed to show the principle of the method. The color, density and constitution of the London sewage varies from hour to hour. The first sample to be dealt with was of a light yellow colour looking something like weak tea with a little milk, so far as could be seen, containing very little solid matter in mechanical suspension. This when poured into a test jar, had a current passed through it between a pair of iron electrodes with about six volts, E. M. F. An extremely rapid effect was produced in less than two minutes, the jar was seen to be filled with a flocculent precipitate which was gradually carried upwards by bubbles of liberated hydrogen. After three minutes the electrodes were withdrawn and precipitate left to collect at the top. In actual practice, after the effluent has passed into the settling tank, the precipitate, in the course of two hours, loses the whole of the entangled hydrogen and sinks to the bottom of the tank. The sludge thus formed is similar to that produced by chemical process now in vogue, except that the electrical method possesses the obvious advantage that the total quantity of the material has not been increased by the addition of chemicals. The exact nature of the chemical action upon the organic matters in solution is not wholly understood. Mr. Webster is inclined to think that the first step in the process consists in the formation of a hypochlorite of iron. All sewage is rich in chlorides and this fact is of advantage in increasing the electrical conductivity of the fluid. Mr Webster's proposals for the electrolytic treatment of sewage upon a wholesale scale were of so novel a character that a good deal of scepticism was at first evinced. On Wednesday last, however, we spent some hours at Crossness where we witnessed experiments, both on a laboratory scale and also in the works erected by Mr. Webster which are capable of dealing with half a million of gallons of sewage per day. In comparing the cost of any chemical process at present in use, it is desirable to ascertain whether this chemical process at present in use is effectual. It is certain that in many cases owing to the small quantity of chemicals employed, the treatment is very nearly ineffective. We are therefore inclined to take a very hopeful view of the future of this new and most important branch of electro technics."

From the *Electrical Engineer* :

"To what base uses may we return !! is the *Electrical Engineer* tempted to exclaim when he hears of the application of force he deals into, not now light and beauty and swift travel, but to the treatment of sewage? Yes, and to what beneficent and healthy uses, he may well add in consonance with the sanitary engineer, as it is proved to him that the same current that would electroplate the teapots and spoons in Sheffield, alters with its magic touch the most vile and deadly matter now poured by millions of gallons daily into our bays and rivers, into a pure liquid, and not only into a pure water, but into an absolute disinfectant. Such is indeed the fact, and the science of health, the coming science of the future, will have at its hand the aid of electricity to settle the enormous difficulty it has hitherto had to contend with in the disposal of sewage of its large cities and towns, and an engine and a dynamo will become the modern Hercules which will purge the Ægean stables of our metropolis. Mr. Webster has been working in connection with sewage and water treatment most of his life. Latterly he conceived the idea that the precipitation might be brought about by electrolysis and made some experiments with carbon plates, but it was not until about three years ago that the idea of using iron plates as electrodes, which has made the process a complete success occurred to him. The average of twenty analyses taken at Crossness during 1888-89, show that the raw sewage very turbid and opalescent, containing 33.35 parts of suspended matter in 100,000, the effluent was clear containing 1.56 parts per 100,000."

Iron, 29th March, 1889 :

A satisfactory solution of the question of the precipitation of organic matter in sewage and the delivery of the effluent in an innocuous condition seems to have been found in the system of sewage treatment, by electrolysis, invented by Mr. William Webster. By this system it is claimed that the entire sewage of London can be precipitated at an annual cost of three hundred and sixty-one thousand pounds. The system of Mr. Webster compares more favourably than those obtained by chemical treatment.

Similar favourable notices have appeared in *Pall Mall Gazette*, *Industries*, *Journal of Gas Lighting* and *Standard* newspaper.

All of which is respectfully submitted,

C. W. COVERNTON.

REPORT OF COMMITTEE ON SEWAGE AND WATER-SUPPLY, ON SEWAGE FARM AT LONDON ASYLUM.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your committee on sewerage and water-supply was, last autumn, directed to consider certain plans for a system of irrigation known as the Intermittent Downward Filtration System; which system the forwarders of the plans intended to apply to the disposal of the sewage of the Asylum for the Insane, near London.

Your committee examined these plans and having been led to a favourable conclusion regarding them, reported to the Board accordingly, and its report was adopted by the Board.

Your committee has now much pleasure in reporting further, that the works there proposed for construction have been completed, and that they were formally opened on the 5th day of July in the presence of Government Inspector O'Reilly, Engineer Kivas Tully, Colonel Waring the Engineer of the works, Hon. Mr. Drury, Minister of Agriculture, Mayor Taylor of London, and large deputations from the City Council, the London Board of Trade, the Hospital Trust Board, the Board of Health, and of the citizens of the town and county.

Your committee was also present having been invited with the other members of the Provincial Board of Health, by the courtesy of Inspector O'Reilly, and it begs to report :

We had already become familiarized with the plans. We now listened to the demonstration of these, in their several details, by Colonel Waring, and having further looked into every part of them, in actual operation, we were persuaded that the system of "Intermittent Downward Filtration" presents a long desired solution of a hitherto formidable difficulty in the sewage problem. It seems to offer the means for thorough disposal of sewage, so that the material is not only innocuous and inoffensive, but is made to be most useful as a fertilizer of the soil.

For the knowledge of the process here employed, we seem to be indebted to the English and French. When apprehended, it is seen to be a process of great simplicity. Contemplating it, one is reminded of a forecast of the late Professor Sir James Simpson, regarding the successful treatment of certain incurable diseases. The knowledge of the modes of cure, the professor said, would be found to lie just beneath the surface. It has been so with that of the safe and useful disposal of the life-destroying sewage. We have been within a hand's breadth of this knowledge for the past fifty or sixty years. The mode by which the end desired is accomplished is by the application in a new direction of the principles of thorough draining.

Some of us are old enough to remember when the practice of thorough draining the fields first came into use, and the *rationale* given to us of its results. We were told, that by thorough underdraining, not only was the superfluous matter carried away through the soil, but further, that wherever water could pass air would follow, and that air was not only itself useful, but was moreover a great decomposer and disintegrator of the soil. We knew a good deal in those days about oxygen, and its affinity for so many substances, but we did not believe that its power of affinity was sufficient to change the composition of town sewage in a short time, and so the utilization of sewage, although it occurred to many, was passed by, by general consent, as being not a very clear or very safe proposal. It was long before we became acquainted with bacteria, and only lately have we known how beneficent many of these are, and potent, because of their abundance in certain soils, to transform, in such soils, a noxious and disagreeable material, into one which is most useful. With this knowledge on our part, without doubt a much more extended field of usefulness will be opened up for these little organisms.

The sewerage of the London Asylum may be described as follows :

The sewage is conveyed from the various buildings of the institution by means of close-jointed vitrified pipes which are kept abundantly flushed, to an underground brick tank, seventy feet in length and about ten feet in breadth, which is capable of holding a much greater quantity of water than the daily supply of the asylum. The bottom of this tank is fifteen feet below the surface. The contents of the underground pipes

leading to the tank have, owing to its depth, a fall into it of some six feet. They fall into a small chamber at one end of the tank, partitioned off from the main body of it, at one end, by an iron screen or grating, the meshes of which allow no solid particles of any size to pass through them into the main body of the tank. By the fall from the pipes into the tank, the solid matters in the sewage are broken up, and are thus permitted to pass through the meshes of the screen, into the main body of the tank along with the fluid matter. At the opposite end of the tank to that where the sewage enters, there is a sump into which the sewage gravitates and from which it is drawn through an iron pipe by the action of a centrifugal pump driven by a 25-horse power engine. The suction is so arranged that the tank can be pumped dry every day. Further, the tank is well ventilated having man-holes to the surface and pipes which run into the chimney of the pump-house.

Arriving at the pump the matter from the tank is farther churned and thoroughly broken up, and is forced through a well caulked iron pipe to the disposal field or sewage farm, about a quarter of a mile away. At the disposal field the sewage, now quite fluid, is received into a brick well, from which it overflows into an open channel of earthenware pipe. The channel runs along the end of the tract of land which has been prepared for the reception of the sewage, the soil and the situation of the tract having been found adapted to that end.

At right angles to this open channel there run, along the prepared land, open ditches eighteen inches deep two feet wide at the bottom and at the top these sides gradually merging into the surface of the ridges between them, those ridges are about 10 feet wide. These are connected with the open channel at the end of the field, but the connection can be cut off at will, by gates. The sewage of one day is run into three or four of these ditches, next day into as many more, and that of the third day into the remainder. By the fourth day the land intersected by the first is ready to receive and to decompose its proportion again.

In being prepared for receiving in this manner, and decomposing the sewage safely and inoffensively, the land has been carefully levelled and underdrained. In its way from the superficial ditches to the deep open tile drains laying equidistant between them the sewage is exposed to the action of the bacteria and air in the soil of the field, and finally escapes into the tile drains, from which it finally passes as harmless water, as is usual in drained fields.

The position of the London asylum is such that it cannot avail itself of gravitation to run off its sewage. Hence the necessity for steam power to elevate the material to the field of distribution. No doubt this is to be counted as an additional expense in the draining of this place; but the expense is not by any means to be regarded as wasted. As far as your committee could judge, the more complete comminution of the more solid constituents of the sewage by the action of the pump, is no small advantage, for the discharge from the distributing well is here perfectly fluid, whitish, like soapy water, and free from offence to sight or smell, and, your committee would suppose, much more ready to yield to the agencies in the soil which are ready to deal with it.

It may not be within the limit of the duty of your committee to deal with the question of cost, yet it may be said that the safe disposal of sewage is a matter of ever-increasing moment, and that with regard to it we have but a choice of evils. On the one hand costliness in money, on the other costliness in life and health, and also of money. Which of the evils shall our cities, towns and villages choose to meet?

The deadly results of sewage pollution need hardly in this day be insisted on; too many are familiar with the diseases which arise from this cause. They have seen their children and their youth, especially their young women, die under the sufferings of diphtheria, and their friends from early life to the verge of old age sink under typhoid fever. Those are not the only diseases which are consequent on the presence of filth. They are mentioned as examples of suffering thus brought about. If much money is needed to remove the material which is a fruitful source of those and other fatal ailments, and to reduce it not merely to a state of harmlessness, but to a condition of usefulness, it is surely money well spent. Further, if there are fanciful or questionable ways of disposing of corporation funds, such ways should not be permitted to interfere

with the expenditure necessary for saving from death the multitudes who are every year being destroyed in our families by breathing and drinking the products of the fermentations of the excrement of man and beast. May we venture to recommend that all parties unite to arrange, by legal enactments that municipalities shall provide for the quick removal from their neighbourhood of all material, whether scattered on their streets, lying in heaps in secluded places, or issuing from their drains, and for its immediate and complete decomposition. Should we not also use our utmost influence to re-enforce the existing law against sewage being run into streams and water courses?

J. D. MACDONALD.
H. M. MACKAY.

October 4th.

As supplementary to the foregoing report your committee would say that at the meeting of the association of the executive officers of health at Brockville in August, the association, of which your committee forms a part, examined the system of drainage being at the time put in construction in that town. Brockville is putting in operation the "Separate System" of drainage, using the old drains of the town to carry off the rain-fall only, and your committee had the opportunity of looking into the system in practice there.

REPORT ON THE POROUS CARBON SYSTEM FOR PRECIPITATION OF SEWAGE AT ONTARIO AGRICULTURAL COLLEGE.

To the Chairman and Members of the Provincial Board of Health :

MR. CHAIRMAN,—On the 7th of October last, your Committee on Drainage and Water Supply, by invitation from the Hon. Charles Drury, Minister of Agriculture, proceeded to Guelph for the purpose of being present at, and of inspecting the drainage of the Ontario Agricultural College. Those works were to be, that day, formally opened. They had been under construction by Mr. Straith Miller, under the supervision of the Department of Public Works, and the nature of their operations was said to be such, that, at little expense, the sewage was so dealt with by decomposition and precipitation, that the effluent fluid, after these processes were undergone, consisted of water pure enough for any purpose. The substance employed for these purposes is called "porous carbon," and consists of a lignite, enriched with sulphates of iron and of alumina. It is obtained by quarrying or mining in Devonshire, in England, and is meanwhile so cheap that we were assured by Mr. Miller that a sufficiency for all the purposes of the college for a year could be laid down there for twenty-five dollars. Your committee has since been informed that the amount here stated will not be sufficient now.

There were present on the occasion : The Hon. Minister of Agriculture ; the Hon. the Provincial Treasurer ; a large number of official and prominent gentlemen from the counties of Wellington and Waterloo, from the city of Guelph, including gentlemen of the press from that city, as also the Superintendent of the Asylum for the Blind at Brantford, and the Superintendent of the Asylum for the Deaf and Dumb, near Belleville, and two Inspectors of public institutions. This Board was represented by the Chairman and Secretary, as well as by your committee.

Your committee was kindly and courteously shown over the works by Mr. Miller, and had every point clearly explained to them.

Mr. Miller first led down a gentle slope, behind the college for a hundred yards or so, and stopped at a covered man-hole. Removing the cover, he showed us a small vault 9 or 10 feet long and 5 or 6 feet broad. In the bottom of this vault lay a double vessel, oval in shape, not unlike an ordinary kitchen boiler with another within it, having a space of a few inches between the sides of the outer and inner vessel. Into this space,

at what was the higher end of the oval, the sewage from the college was conducted by an underground pipe, and flowed through it to the other and lower end of the oval, in its course through getting mixed with the "porous carbon." This substance had been placed in the form of a coarse powder in the inner vessel, the sides of which were perforated near the bottom. Into this inner oval box there fell, from a height of several feet, a stream of water from a pipe placed on the side of the vault. The fall of the water was high enough to churn the contents of the box and to dissolve or suspend much of the porous carbon, so that it could escape with the water through perforations in the sides of the vessel, and so, in the interspace between the vessels, become mixed with the sewage which was to be purified. Leaving the vault by a pipe at its lower end, the mixed sewage and porous carbon were conveyed underground to a small stone building not many yards down the slope. This building is the "tank house." In it are three tanks, two larger, placed side by side and occupying two-thirds or more of the building, and one smaller tank at a lower level, and occupying a portion of the remaining space. The two former are the "settling tanks," which are used alternately, one being filled with the mixed sewage and porous carbon, while the mixed material with which the other has been filled is settling and decomposing by chemical combination. As soon as the settlement is complete the fluid is run off clear into the third tank.

For the satisfaction of the curious and the sceptical a glass tumbler had been kept here by Mr. Miller, and your committee was invited to test the purity and potability of the waters, called by Mr. Miller the "effluent." The fluid seemed sufficiently clear, clearer indeed than the glass in which it was held up for inspection, but your committee did not consider that the parties present were sufficiently high in office to make the test proposed of any value, and so they were not forward to make it.

It was stated that the solid matters precipitated in the settling tank formed a very valuable manure, which on being dried and powdered might best be used by being dibbled in with the plant seed.

The effluent is conducted from the tank-house by a tile to a water-course at the bottom of the incline, thence passing into the river Speed some half-mile distant. Inasmuch as the effluent, though deprived of the coarse portions of the sewage, retains a certain amount of soluble organic compounds, notably, albumenoid ammonia, it is very desirable as pointed out at the time by a member of your committee that it be further purified by leading it along the hillside in several radiating drains, made of field tile, thus allowing it to soak away into the soil, there leaving its soluble organic constituents to benefit crops growing there, and preventing the possibility of the accusation of any nuisance being caused by the decomposition in the effluent waters afterwards as they pass along the watercourse.

Before concluding this report, the undersigned are called upon to refer with deep regret to the death of their coadjutor on this committee, Dr. Hugh D. McKay, as well as to that of our lamented friend and associate on this Board, Dr. Horace P. Yeomans. Both were young men, in the prime of their lives and usefulness. Both were continually striving after increased professional excellence, and they were marked by a singular gentleness and frankness of demeanor which became them as kind physicians and as christian gentlemen.

Respectfully submitted,

J. D. MACDONALD,
P. H. BRYCE.

 REPORT OF THE COMMITTEE ON POISONS.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Although carbolic acid is in common use as a disinfectant, its exceedingly poisonous nature when swallowed does not appear to be generally known or understood. In fact many persons, otherwise well-informed, are not aware that it is a poison. Owing to the fact that it is much recommended for disinfectant purposes, by sanitary authority, many persons appear to think that it is incapable of causing harm. A word of warning in this respect will therefore not be amiss. This preparation is frequently prescribed by physicians in obstetric practice, more particularly in cases where some rent or tear in the genitals has occurred during the process of parturition. Inasmuch as the acetate of lead or permanganate of potash dissolved in water is generally sufficient for the local treatment of such cases, it would be well to restrict the use of carbolic acid, and when it is ordered, to inform the invalid and her attendant of its nature.

An accident occurred recently in the practice of a member of your committee, illustrating how dangerous carbolic acid may become when carelessly handled. Shortly after breakfast, a boy of four years of age drank about a tablespoonful of a liquid which was lying in a glass, over about half an ounce of carbolic acid in crystal. He found the glass on a mantel-piece, where it had been put by his grandmother, who was using its contents for a sore wrist. This rudely prepared lotion had been given the old lady by some sympathising stableman visiting next door, who was doubtless in the habit of employing such preparations for their wounded horses. Had she purchased it from a chemist, the phial containing the preparation would have been labelled poison. Not thinking that this liberally donated medicine was a poison, the old lady left it in the glass, and her grandson taking it for ice-water drank it. The child's mother though alarmed at his evident distress, did not discover that carbolic acid was a poison until she had inquired of a neighboring druggist. Vomiting of the contents of the stomach began soon, the vomited articles having a strong odor of carbolic acid. When seen about twenty minutes after the accident, his lips, tongue and the mucous lining of the mouth were stained of a grayish white color, his eyes were sunken in his head and had a dazed expression, his extremities were cold, and his hand was moved about so that the pulse could not be counted. Lime-water alone and combined in equal parts with milk was freely given; hot blankets were wrapped about his naked body. Next day olive oil in teaspoonful doses was ordered to be given three times a day. Since then (the accident occurred on April 27th) his patient has improved, though it is quite possible the end is not yet, and that he may suffer in after years from some disorder due to the corrosive action of carbolic acid.

Recently in one of the London hospitals, a night-watchman was brought in who had swallowed 3 oz. of common brown carbolic acid, such as is used for drains, thinking that it was cold tea. He presented all the well-known symptoms of carbolic acid poisoning, and fell rapidly into a state of coma. The stomach-pump was used and the stomach washed out with water; artificial respiration and hypodermic injections of ether were employed, but without avail as the patient died in forty-five minutes after taking the poison.

To what are the toxic effects of carbolic acid due? To two principal causes. 1st: It coagulates albumen, it is corrosive and may cause death by severe injury to the mucous membrane of the mouth, gullet and stomach. It has even been reported to cause death as the result of external application; 2nd: It is inebriant and in its chemical deportment stands, like benzine, very near the alcohols. What is a fatal dose of carbolic acid? Taylor says: "A woman died from swallowing a wineglassful of carbolic acid, probably a weak aqueous solution. She did not speak after taking it and died in about half an hour. In 1867 a child under two years was brought into Guy's hospital under the effects of this poison. It had taken two teaspoonfuls of the ordinary brown liquid carbolic acid. This proved fatal in twelve hours. In another case a tablespoonful proved fatal to a young man. It has caused death rapidly. In a case which occurred to Mr. Jeffreys, an adult died in fifty minutes after taking from one to two tablespoonfuls of the liquid acid."

What is the treatment? No antidote has yet been discovered. The stomach should be evacuated by copious albuminous drinks, such as milk and white of egg, or by the stomach pump, injecting and withdrawing such liquids. Oil is also of use by rendering the action of the acid less concentrated and by delaying its absorption. The tendency to collapse should be combatted by drugs, heat and by an emetic containing some alcoholic liquid. Should this stage be got over safely, a diet of lime-water with milk should be used for several days. Occasional doses of olive oil should also be given.

While writing out these hints on the treatment of cases of poisoning by carbolic acid, we wish more particularly to draw public attention to the fact that this preparation taken into the stomach is a deadly poison, and to express the hope that all persons using it will take precautions so that it may not cause serious accidents or death.

All of which is respectfully submitted.

J. J. CASSIDY.
FRANCIS RAE.

REPORT OF A COMMITTEE APPOINTED TO INVESTIGATE A NUISANCE IN YORK TOWNSHIP, ARISING FROM A FAT-RENDERING AND HOG-FEEDING ESTABLISHMENT.

MR. CHAIRMAN AND GENTLEMEN:—At the last quarterly meeting of the Board, your Committee were requested to examine the premises of Messrs. Glanville & Muffit, York Township, complaints having been made that the said premises were in such a filthy condition as to cause a nuisance and be a danger to the public health.

We therefore visited the premises in question, and subsequently sent the following letter to Messrs. Glanville & Muffit and the York Township Local Board, conveying thereby our views as to the means to be adopted to remedy the nuisance:

PROVINCIAL BOARD OF HEALTH FOR ONTARIO,
TORONTO, Oct. 17th, 1889.

Messrs. Glanville & Muffit, Seaton Village, Toronto, Ont.

SIRS,—In consequence of a complaint made to the Provincial Board of Health of Ontario, of a nuisance said to exist on your premises on the Vaughan Road, York Township, we were appointed a Committee to investigate the same, action being taken under sec. 29 of the Public Health Act, as also in compliance with a request made by the Local Board under sec. 64 of the same Act.

We proceeded to your premises on October 9th inst., and found evidence enough to show that there were reasons for the complaint, as will appear in the following particulars:

(1) The floor is so constructed that it cannot be readily kept free from accumulations of animal matter. In those parts of the building devoted to the storing, selecting and boiling of the materials, it was covered with putrescent animal matter, exhaling the most nauseating odor, while at the further end of the building the insufficient use of absorbent bedding in the pig pens leaves the floor in a more or less filthy and bad-smelling condition from the presence of manure.

(2) The area at the rear of the building on the side of the hill is covered with an unnecessarily large accumulation of manure and slops taken from the floor of the building. Exposed as they are to the air, they give off the excessively disagreeable odors associated with pig manure, made all the worse by the rains which aid in keeping up the putrefaction and further spread it over an increasing area of ground below. We have learned that with continued rains the washings from this accumulation pollute the creek running through the ravine.

(3) In the wide space to the west of the building, where the pigs run, the whole ground, muddy from previous rains, was covered with pig manure, while tramped into the mud or lying on the ground were portions of entrails which had been thrown to the pigs, and, putrefying, gave off the nauseating odors peculiar to all dead and decomposing flesh.

(4) Large quantities of manure brought from the slaughter-house, and containing blood, with the other accumulations of the pens, were exposed to the weather at another place on the hill-side.

(5) In the pen to the north of the ravine, owing to the large number of pigs running in the uncovered enclosed space, the ground had become polluted with their droppings, which, decomposing, increased the already polluted atmosphere about the premises.

We are aware that a permit to carry on your business has been granted conditionally by the Council of the Township, but would further say that it may be rescinded at any time, and the penalties for continuance without such license are so heavy as to make it most desirable that you use every endeavor to comply with the spirit under which such permit has been granted. Should such precautions be neglected, not only will the Township Council, under sec. 9 of the Public Health Act, be requested to cancel the permit, but this Board will also find it necessary to take action for the abatement of the nuisance under those sections of the Public Health Act giving the necessary power in such cases.

Having been requested by the Local Board of your township to examine your premises, we have advised them that you should take the following precautions so as to carry on your business with the view to preventing the creation of a nuisance :

1st. The slaughter-house refuse, when brought on the premises, should be stored in a tightly constructed compartment, kept cool during the hot weather by ice, until such time as it is to be boiled.

2nd. That the boiling or steaming should be conducted in steam-tight vats, or in pots with tight-fitting funnel tops, with tubes leading the vapors therefrom into the draught of the furnace. Boiling in open boxes or vats, as carried on at present, will not be permitted.

3rd. The floors of the boiling rooms and pens should be so constructed as to permit of rapid flushing. They should also be made clean, with abundance of water containing five per cent. of sulphuric acid, or one pound of sulphate of iron dissolved in ten gallons of water ; or by treating the floors freely with abundance of gypsum, or sawdust, or other efficient absorbent.

4th. The manure now left exposed on the hill-side to the north of the building must, with the other manure from whatever source, be properly stored under cover, to prevent putrefaction as much as possible ; while over each successive accumulation weak solutions of sulphuric acid or sulphate of iron may be thrown ; or, better, sufficient gypsum or sawdust may be added to absorb the odors. In this way not only will a nuisance from this source be prevented, but the ammonia and other products of decomposition possessing the greatest manurial value will be preserved.

5th. The pigs must be kept in covered and properly floored pens, where the manure may properly be collected from day to day, and the floors kept dry and clean ; beddings of straw and shavings, with sufficient absorbents as gypsum and sawdust must also be generally applied.

6th. The washings from the various sources, as from the boiling rooms and pens, can be made to flow by a small 5-inch glazed tile-pipe to a tank on the hill-side, wherein the solids may be allowed to settle ; while an over-flow pipe, with its mouth beneath the surface will carry off a comparatively clean water. This can be allowed to flow a few feet by another glazed pipe to a second tank lower down, with a tumbling basin so arranged as to empty itself at intervals. From this latter tank a 5-inch field tile is to be laid to deliver into a diverging series of tiles, lessening in diameter as they branch, and laid two or three feet beneath the soil in the field below. Soakage into the soil from these pipes will thus take place. and when the ground becomes super-saturated, clean water will run into the creek below.

All these remedies are practical, and can easily be carried out at a comparatively small expense. The manure can be frequently carried on to the land and ploughed under. The small entrails must be either properly treated by boiling before feeding, or be buried with the manure.

Not only will such systematic treatment of a refuse, always difficult to deal with, make the business much more agreeable for those engaged in it, but it will also tend to the healthier condition of the pigs, as filthy food is no more good for them than for any other animals. A saving in this way will equally result. We prefer to aid rather than hamper any necessary or economic industry; but the welfare and comfort of the public, and particularly the preservation of the public health, demand that every reasonable precaution be used by those engaged in such industries as yours to carry them on without nuisance or detriment to the general good.

We have the honor to be,
Your obedient servants,

Signed. PETER H. BRYCE,
J. J. OASSIDY.

REPORT *RE* NUISANCE IN EAST ZORRA, FROM HOG-PENS IN CONNECTION WITH A CHEESE FACTORY.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN,—In compliance with a communication from Dr. Bryce, the Secretary, dated 21st November inst, *re* a pig nuisance complained of at the village of Hickson, near Woodstock, on the premises of Mr. John King, I proceeded on the 29th of November to inspect the premises, and to investigate the nature and extent of the nuisance, and gathered the following information:

Mr. King owns the east half of lot 21, East Zorra, bounded on the east by the 13th line, the south faces on side road, and on the west by the P. D. & L. H. Railway running on the blind line. On the south-west corner is situated a large cheese factory that handles every season the milk of from 700 to 900 cows, and the whey from all this milk has for the past ten years been consumed on this 100 acre farm. Mr. King handles each season an average of 300 to 500 hogs, the larger number being fed outside and allowed to roam in certain fields, while a considerable portion are confined and prepared for the market in pens. The pens, as shown by the accompanying rough sketch, are situated adjoining the barnyard, near the centre of the farm and distant 300 yards from the factory, and about 400 yards from the nearest residence to the east. Between the pens and the side road is the residence of Mr. King, and between the pens and the residence passes a small stream that goes dry in the summer. This stream passes within 30 feet of the pens, and running eastward crosses the 13th line, goes through the farm of the complainant, and about a quarter of a mile further on empties into a living stream.

On the day that I visited the premises the ground was covered with snow, and, besides, not being pig season, evidences of nuisance did not exist as would be present in the summer months. But from the situation of the pens contiguous to a barnyard, on a mucky soil, and but a short distance from the stream, with no adequate provision made for taking care of the droppings and excreta from such a large number of pigs fed on whey, but all or nearly all being allowed to find its way into the stream, the conditions are certainly suggestive of an unpleasant and unhealthy state of things which not only demand, but easily admit of improvement from a sanitary point of view. However, in view of the pens being situated at a considerable distance from other dwellings (from 300 to 400 yards), there does not appear to be much complaint of effluvia or foul odors.

To mitigate the difficulty I have made the following recommendations :

1. That the smaller and more dilapidated pen be removed.
2. That the other be repaired, and the floor made impermeable to fluids so as to prevent the fouling of the soil underneath.
3. That catch troughs, water-tight and large enough to carry all the fluids and excreta into tanks at south end of pen, be placed on each side of the building.
4. That the tanks, one placed at each south corner of the pen, be of sufficient capacity to contain all the accumulations for a sufficient time to enable frequent removal of contents for distribution upon the land, and to be plowed under the soil.
5. That the troughs and floors of pens be thoroughly scraped and flushed with water every day to prevent precipitation and accumulation of solid residue upon them.
6. That the tanks be emptied at latest every alternate day, but better every day.

With the above recommendations carried out, and they cannot be considered unreasonably exacting, the nuisance complained of will be abated to the satisfaction of the complainants.

I am also happy to say that Mr. King approves of and accepts the recommendations, and has promised to have them carried into effect.

All of which is respectfully submitted,

H. M. MacKAY.

TORONTO, May 14th, 1889.

REPORT OF UNION SCHOOL, SIMCOE, COUNTY OF NORFOLK.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—During a brief sojourn in the county town, where for more than forty years I was practising and where for more than twenty I was a member of the High School Board, I was requested by members of the present Board to visit the building and report on its present condition with the view of obtaining from the Provincial Board of Health, at its session in this month, their imprimatur of the outlay that in their judgment the present condition of the building imperatively calls. Accordingly on Saturday last, accompanied by Mr. Christie, the Principal of this Union School, I made an inspection and from the notes at the time taken beg to submit the following report :

I may premise these written notes with the statement that the building was erected in the year 1857, at a time when the number of scholars in attendance was very much smaller than at present and accordingly the accommodation then provided was considered fully equal to the sanitary requirements of the institution. May 10th, visited the building as mentioned at the special request of members of the Board, found the ventilation of the different rooms faulty in the extreme ; floors in all the old parts of the building in a state of decay ; the wide spaces between the boards the receiving places of dirt, dust and organic matter ; the ventilation of the rooms open to the most grave objection, as a consequence the atmosphere of these class rooms during school hours is necessarily injurious to the health of both teachers and scholars.

On the Saturday morning that I visited the said school rooms, notwithstanding that since the closure on Friday afternoon with the windows open a heavy close smell was apparent on entering each room. Number of pupils in the common school, 425 ; for which number seven class rooms provided. Number of pupils in Grammar School I have forgotten. Floor space for each of four light rooms, 18x40. In a new wing some years back erected, two rooms each 18x30 ; Grammar School rooms, two in number, 50x30 each. Insufficient attention paid to the admission of light from the rear and the left of the pupils. Latrines very much too small for number of pupils and those for the use of

the boys in too close proximity with those allotted for the use of the girls. Recommended the adoption of the system of ventilation that a deputation of members of the Board, I was informed, had just returned from seeing most successfully in operation in the Toronto Public Schools, viz, Smead-Dowd system, the said system being in the experience of our Provincial Board one of the best to be determined on. Suggested also that all the old flooring in the various school rooms should be immediately on the closure of the school for the summer holidays be removed, and for the decaying pine floors narrow oak flooring should be substituted, tongued and grooved and forced into close approximation, then to be treated with two successive coats of boiling linseed oil. Further for the protection of the sight of the pupils there should be a strict avoidance of cross-lights, substituting as far as possible unilateral light, or if more or less necessarily bilateral, stronger on the left than on the right. Enlargement of play grounds sufficient to permit of the erection of separate covered buildings for boys and girls, so as to enable them to exercise on rainy days or during very sunny ones at the recreation period. Also suggested that the existing desks should be discarded and modern ones substituted better adapted for the proper attitude of the scholars being maintained during school hours without undue tiring of the spinal muscles. Neglected to enquire whether evidence of vaccination and revaccination was required before admission of the pupils to the school. Would also recommend that the report on the subject of School Hygiene, most exhaustively treated by Drs. Cassidy and Yeomans, members of our Board, and submitted to and adopted by the Hon. Mr. Ross, Minister of Education, for incorporation, be distributed for use by all the school teachers in these schools as also the school trustees, as from information it appears that such pamphlets are being distributed by the Education Department.

I might add that it would greatly add to the reputation of Simcoe, being one of the county towns in which sanitary legislation was viewed as the chief consideration by the city fathers, if in their very important hygienic measures adopted in recent years they would determine on adding some such system of pure water supply as has been recently carried out in Brantford.

APPENDIX

CONTAINING THE

ANNUAL REPORTS OF LOCAL BOARDS

IN THE VARIOUS

MUNICIPALITIES OF ONTARIO.

ANNUAL REPORTS OF LOCAL BOARDS OF HEALTH.

CITIES.

BRANTFORD.

MEDICAL HEALTH OFFICER'S REPORT.

In reporting on the sanitary condition of the city of Brantford and the work done in regard to it during the past year, I may first briefly mention that I have availed myself of opportunities occurring during the year for obtaining much valuable information on sanitary matters.

At Brockville, in company with Dr. Heath, I saw the practical operation of the Waring system of sewerage which is so strongly recommended for this city.

At Ottawa I had the privilege with the obliging co-operation of the Chief Analyst of personally making a number of analyses of milk according to the most approved methods used there.

At the meeting of the American Public Health Association in Brooklyn there was an opportunity of studying a large number of sanitary questions in company with many of the most scientific and experienced practical sanitarians on the continent.

I had also the opportunity with Dr. Bryce and other members of the Provincial Board of Health of examining the Brooklyn water-works system, also of investigating the sewage farm and works at Orange, New Jersey, which resemble those established by the Ontario Government at the London Asylum; also the sewage precipitation works at Coney Island which are worked on a plan similar in principle to that now being applied by the Ontario Government at the Agricultural College, Guelph.

We also saw in operation the Engle Crematory probably the most perfect Crematory yet devised.

Opinion is much divided as to the comparative merits of cremation of garbage by means of a furnace, and of dealing with it by what is called the Merz or Vienna process now in operation in Buffalo and other places.

We also investigated some of the most recent improvements in ventilation in connection with steam heating as applied to schools, hospitals, and other public institutions.

Some of the information thus acquired will I trust hereafter prove useful in dealing with various matters relating to the public health in the city.

DEATH RATE AND CONTAGIOUS DISEASES.

The general health of this city for the year ending October 1889 has been I am pleased to say better than for several previous years.

The actual number of deaths occurring within the city limits was 204, which in a population of 14,273 gives a death rate of 14.3 per 1,000, as compared with the rate of 16½ in 1888 and 1887.

The number of deaths from zymotic diseases was as follows, namely :—

From Typhoid fever, 9 deaths (13 in '88 and 8 in 1887.)

From Diphtheria 13 deaths (10 in '88 and 19 in 1887.)

Scarlet fever 1 death (0 in '88 and 2 in 1887.)

From measles 1 death (1 '88 and 0 in 1887.)

Whooping cough 4 deaths (5 in '88 and 1 in 1887.)

Cholera Infantum &c, 18 deaths (26 in '88 and 23 in 1887.)

TYPHOID FEVER.

The whole number of cases of typhoid fever in Brantford was 89, with 9 deaths.

Of the 89 cases 42 were treated in the hospital, exclusive of a number of cases in the suburbs of the city which are not included in this report.

In view of the relation between impure well water and typhoid fever, circulars were issued under instructions of this Board early in July advising the public against the use of raw water and strongly urging the previous boiling of all drinking water during the summer and autumn months.

A large number of families have acted on this advice and some cases of fever have probably thus been prevented.

Numerous enquires among the 89 reported cases shew that few if any of them, practised boiling their drinking water and it is a reasonable supposition that had they all done so we should have had a less number of cases of typhoid fever to report.

The location of all the 89 reported cases of fever is recorded in the books of the Health Office. It is impossible to give them in detail in the limits of this report, but on examining the record it is seen that 50 or nearly $\frac{2}{3}$ of the cases occurred in situations where the sanitary conditions are known to be especially objectionable, such as contamination of the wells or to the pollution of the soil from long saturation with liquid refuse.

DIPHTHERIA.

Of diphtheria there were 58 cases reported but owing to the mildness and briefness of many cases of this disease they escaped notice and the reports are necessarily incomplete. Seven deaths from diphtheria or over one-half of all the fatal cases besides a number of other cases not fatal, sprang from the case of one little girl on Terrace Hill.

In a healthy neighborhood in a clean and tidy kitchen this child was accustomed to play at the kitchen sink, to pump water and watch it run down the waste pipe which led to a buried sink pit, she contracted a fatal diphtheria; her father took the disease from her and also died, and the other five deaths occurred in one house, that of an immediate neighbor visiting and directly exposed to this case. Nine other non-fatal cases occurred among the immediate neighbors also exposed.

A rigid exclusion of children in that neighborhood from school and the isolation as far as possible of all exposed persons happily prevented the wide extension of this local attack.

In previous reports I have referred to several instances of diphtheria from sink holcs, connected with dwellings, and the sanitary inspector has done much in the way of exterminating such poisonous and dangerous structures.

CONTAGIOUS DISEASES AND SCHOOLS AND LIBRARIES.

The amendments to the Public Health Act, requiring the co-operation of teachers in the schools in notification of contagious diseases and preventing the circulation by public libraries of books exposed to infection, have been fairly carried out during the year. A difficulty in dealing with infected books has been that no apparatus or appliance for disinfection of books was apparently known to exist, the cost of which was not greater than the value of the books ordinarily requiring disinfection.

I am glad to say however that we have now in operation an apparatus which will enable us to completely disinfect books as well as many other small articles with but little trouble and at the most trifling cost.

SEWERAGE.

In every annual report I have heretofore made to this Board I have referred to the necessity of sewerage for this city. Many influential citizens have urged this matter in years past but up to the present hour not one rod of public sewer has ever been constructed.

Owing to the inauguration of the new water works system it is obvious that the volume of liquid refuse to be disposed of will at once be greatly increased and the necessity for sewerage and drainage will be greater than ever before.

It is plain that the public fully realize the necessity for this work being no longer delayed and that whenever a good, efficient and unobjectionable scheme is offered that can be carried out at a reasonable cost it will receive general support.

It is expected that such a scheme will shortly be brought forward and that there will be nothing to prevent the next council from taking the matter in hand. To that council it is hoped will belong the lasting credit of having carried out the much desired work.

DRY EARTH SYSTEM.

On account of absence of any sewerage in Brantford and the universal dependence on privy pits for some fifty years, with the common practice of covering old pits and digging new ones from time to time the land in many parts was honey-combed with these pits new and old, the earth was saturated with impurities, the ground air round most dwellings was impure and unwholesome and a large proportion of the wells were contaminated and dangerous; with the growth of the city, this evil was being constantly extended and more permanently established.

Under these circumstances the Board of Health of this city resolved some four years ago entirely to prohibit the further construction of any privy pits and as rapidly as possible to abolish those already existing, causing dry earth closets to be substituted for them.

The success of this work has been something remarkable, no new pit has been allowed to be constructed since that time, and many hundreds of old ones have been emptied, cleaned and filled up with clean fresh earth. This system is now exclusively in operation in all the public schools, in the county buildings and gaol, and in other public buildings and factories, and in close upon one thousand private premises. Of the 425 pits emptied during this year 190 were forever abolished, the pits being refilled with fresh earth.

The dry earth system does not in the least provide for the large volume of liquid refuse as tub-water, house slops, manufacturers' waste &c., &c., which unless there be ample grounds, must either be discharged into the street gutters or temporarily stored in cisterns.

It therefore remains absolutely essential in all the more populous parts of the city to have a good system of sewerage that should be established and the dry earth system universally carried out on all those premises where sewerage is not applied or to which it may not be extended.

GARBAGE QUESTION.

A good deal has been said on the garbage question and I have in previous reports urged the necessity of systematic removal of garbage by a public service. I have carefully investigated this matter and I do not regard a crematory as necessary or even desirable in Brantford at the present time.

No complete, successful and satisfactory cremation of garbage has yet been accomplished in any American city. In some great cities the partial efforts at cremation have been abandoned and the Merz or Vienna process substituted. Cremation has succeeded

with moderate quantities of selected garbage and the time may come when a small crematory for certain uses may be desirable here. The attempt to cremate great quantities of promiscuous garbage has, thus far, proved the process to be both extremely expensive and offensive. In this city for a generation to come all the dry refuse is required for filling in, and the limited amount of animal and vegetable refuse can be disposed of without difficulty.

It is believed that two one-horse carts provided by the corporation would be sufficient to give a sufficient good weekly garbage service, and it is recommended that at the beginning of the new year provision be made for this service.

MILK SUPPLY.

The milk supply of Brantford is at present derived from about 16 dairies with about 320 cows. Every one of these dairies has been inspected during the year, most of them several times, in regard to health, food and water supply of the cattle, and in regard to cleanliness of byres, dairies, utensils, &c, with results fairly satisfactory. Samples of milk from all the dairies have been tested several times. These samples are taken personally by the Sanitary Inspector; they are delivered to the Medical Health Officer by number only and after examination the names of the vendors are attached by the Inspector.

One test of course only proves the quality of the particular sample taken. It is quite possible that in some cases the particular sample examined was not as good as that usually supplied by that particular vendor and also some of those running high may possibly have been better than that usually supplied.

This view is confirmed by the fact that some of the dairies where these November tests were rather low in cream, are known to have good clean premises and to use good food. It is intended that these tests shall be frequently made, and much care will be needed by dairymen to keep up a uniform good standard of milk by the liberal use of the best foods, such as hay, meal etc.

OTHER MATTERS.

I have recently visited the public schools, and am pleased to say that every possible effort has been made by the trustees to keep them in as good a sanitary condition as the circumstances would permit.

The water is of course bad, but this evil will soon be remedied. The heating arrangements, mostly by stoves, are unsatisfactory, but I cannot in this place enter fully into the subject.

The limits of this report also prevent a reference to some other important matters.

I conclude by saying that the location of this city is one naturally highly favorable from a sanitary point of view. The general death rate is low, and would be lower but from the undue amount of preventable disease, chiefly in the shape of typhoid fever. With a good water supply and good drainage the amount of this disease may undoubtedly be reduced, if we are to place any value on the experience of other places, to one-third of the present amount, not to speak of the concurrent improvement in general health.

When these necessary works are completed and in full operation, there is no reason why Brantford should not take, as I believe she will take, a sanitary position in the first rank.

The cost of our new waterworks, of a sewerage system, and of other sanitary reforms will then also be found to be small as compared with the resulting enhanced value of all property in the city and its suburbs,

EGERTON GRIFFIN, M. D.,
Medical Health Officer.

BELLEVILLE.

MEDICAL HEALTH OFFICER'S REPORT.

I had orders issued for the cleaning of yards and emptying and disinfecting of water-closets. The inspector made a house to house inspection of the city, and reported to me any infraction of the law.

The slaughter-houses were visited regularly by the inspector, and I casually inspected them, and saw that the law was properly enforced. The inspector has performed his duties to my entire satisfaction, and is entitled to credit for the healthy state of the city. The mortality from January 1st, 1889 to November 1st, 1888, being one hundred and forty-two, is exactly the same number as last year. I have had reported to me for the past year, fourteen cases of sporadic scarlet fever, three cases of typhoid, six cases of diphtheritic croup and four cases of diphtheria. Not one case of scarlet fever terminated fatally; of the three cases of typhoid one terminated fatally, and of the cases of diphtheria reported not one case died; but out of the six cases of diphtheritic croup three terminated fatally. The medical men, with one exception, I believe, have reported all their cases to me. When I heard of a case I at once ascertained what doctor was in attendance, and dropped him a reminder, and the report was sent in. I drew the attention of the council, during the year, to several drains which, in my opinion were dangerous to the public health, and the council at once passed the necessary orders to have them cleansed and deepened. I would again press upon the council the absolute necessity of drainage. I am afraid that now that so many are taking the water from the water-works into their houses for all purposes, that the health of the inhabitants will suffer if means are not provided to carry the waste water away. I trust the council will appoint a scavenger for the city. It is almost impossible to carry out the requirements of the Health Act without one, and complaints are general about the parties who act as such, both as to charges, and also as to the manner in which they do the work. Early in the spring I wrote to the Secretary of the Provincial Board of Health, also to Mr. Christie, drawing their attention to the danger of our city water being contaminated with the sewage from the Deaf and Dumb Institute, and am happy to be able to say that the action of our Board has at last had the desired effect. At a meeting of the Provincial Board, held in the city of Toronto on October 4th, the Board requested the Government to introduce, as an experiment, the system of electrolysis of sewerage, (as carried on at the Crossness Works on the River Thames, in connection with the London sewage), at the Deaf and Dumb Institute, and trust that the Government will carry out the request of the Board, and thus do away with the complaints raised against that institution by the Board of Health of this city.

R. TRACY, M.D.,
Medical Health Officer.

GUELPH.

MEDICAL HEALTH OFFICER'S REPORT.

The number of deaths within the city limits during the past year was one hundred and forty-four (144), being at the rate of 13.095 per thousand, and forty-five less than last year, in a population of 10,413. The death rate in 1888 was 18.5. Every possible precaution has been taken to prevent the extension of scarlet fever, diphtheria, etc., in the schools, by rigidly excluding all children coming from houses where the diseases were known to exist.

During the year all the rooms in the different schools throughout the city were thoroughly disinfected every other week for two months. This was done at the time that a large number of cases of diphtheria was reported amongst the children of the city. Two hundred and twenty-one (221) cases of diphtheria have been reported during the

past year, sixty-five (65) of which were treated at St. Joseph's Hospital, and seventy-three (73) at the General Hospital, the remaining eighty-three (83) were treated at their own homes. Out of the two hundred and twenty-one cases which were reported eighteen proved fatal. Twenty-eight (28) cases of typhoid fever were reported, twenty-three of which were treated at the General Hospital, two (2) of which proved fatal. Eleven cases of scarlet fever were reported during the year, all of which recovered. I consider that the principal cause of such a large number of cases of contagious diseases, is the absence of a system of sewerage. The saturation of the soil in the older parts of the city by liquid refuse has poisoned the ground and contaminated the air in and about our dwellings, which will rather increase these diseases rather than diminish them, unless the sewerage question is soon taken hold of. The Board of Health have urged the absolute necessity of a proper system of sewerage in the city, and are quite satisfied that until this is done, it will be impossible to prevent the drainage of materials dangerous to the public health into the river, and to keep the city in a really good sanitary state. There are a large number of wells in the city which I fear are badly contaminated, and which repeated examination have shown them to be. The work done in sanitary inspection during the year has been large; the inspector's books show that the following work has been done:—

| | |
|-----------------------------------------------------------|-----|
| Number of yards examined | 253 |
| Number of water-closets emptied | 224 |
| Number of yards found in good condition | 200 |
| Number of hog-pens removed | 16 |
| Number of notices served for dirty yards | 62 |
| Number of old wells cleaned | 5 |
| Analysis of well-water | 6 |
| Dead animals buried | 124 |
| Number of complaints made at inspector's office | 150 |
| Number of houses placarded for contagious diseases | 194 |
| Slaughter-houses inspected | 8 |
| Prosecutions for various breaches of the Health Act | 3 |
| Number of dairies examined | 19 |
| Samples of milk examined | 14 |

In two cases the milk was found to be watered, but after lecturing the parties well, they were allowed to go, promising not to offend again. In my last report I called the attention of our Board to the garbage question, and urged the necessity of some systematic removal of garbage being undertaken as a public work. I find in some places this work has been undertaken by the Board of Health, but in most places the city council has dealt with it. It is a matter all must recognize as very important from a sanitary point of view, and which has been time and again, in one way or another, brought to the knowledge of our Board. At all events the public requirements in this respect are such as to make it imperative that some scheme should be devised.

With respect to the removal of night soil and the emptying of privy vaults during the year, the work has been most satisfactorily carried out by the contractor, and his mode of disposing of it offers, in my estimation, no special objection in a sanitary point of view, whilst it is a material benefit to the parties who purchase it.

During the past year the wards set apart at the General Hospital and St. Joseph's for contagious diseases have been fully occupied; a large number of the diphtheria cases have been sent to them, where they have been well treated. Thirty-two permits to obtain licenses to sell milk have been granted this year, subject to cancellation for infraction of the by-law.

At the last meeting of the Board complaints were laid before it with respect to the condition of the river, between the Eramosa bridge and Allan's. At this time the water had been drawn off for the purpose of repairing the dam, thereby exposing the whole bed of the river. The board decided to telegraph for the secretary of the Provincial Board of Health to come up and give his opinion concerning the state of the river.

Doctor Bryce arrived in Guelph the next day, when the members of the city Board of Health met him and inspected the river from Allan's bridge to Goldie's Mill, after which the Board and Doctor Bryce discussed the matter, when it was proposed that the secretary of the Provincial Board should submit his report in writing as to what he considered the best steps for the Board to take in the matter.

The duties of sanitary inspector, which are very often neither pleasant nor easy, have been discharged by Captain Clark, to my entire satisfaction, and to his active efforts I attribute, to a large extent, the healthy and cleanly condition of the city.

T. A. KEATING, M.D.
Medical Health Officer.

HAMILTON.

MEDICAL HEALTH OFFICER'S REPORT.

Judging from the number of deaths which occurred during the past year, and also from the reports of contagious diseases received at the health office, the sanitary condition of the city was now better; 683 city deaths have been reported during the year ending 31st October, 1889, which is 46 less than occurred in the corresponding months of the previous year. According to the census taken by our assessors, the population shows only the small increase of 336. This has been due to the removal from Hamilton of a large number of Grand Trunk railway mechanics and their families to other points on that line. As the city still continues its old boundaries we cannot avail ourselves (as some places can) of a newly annexed population to diminish the death-rate. It is however very satisfactory to be able to show a decrease independently of any such source.

The death-rate this year is 15.3 per 1,000.

The number of contagious diseases reported (excluding a few cases of measles) is 362, viz.: Scarletina, 151 cases and 2 deaths; diphtheria, 62 cases and 15 deaths; typhoid fever, 149 cases and 6 deaths. There were 22 cases less of scarlatina than in 1888, and 101 cases less of diphtheria. This latter shows a very sensible decrease of a very dangerous disease. No case of it was reported from the 25th July until the 14th of September, and none from that date until the 28th October. Typhoid fever shows an increase of 25 cases with 6 deaths against 12 deaths in 1888—18 of those cases were reported as enteric fever. Medical authorities state the causes of typhoid fever to be numerous and include all kinds of foulness, whether of the air we breathe, the water we drink, or the food we eat, we should therefore study to avoid exposure to all exciting causes, by keeping our dwellings and premises clean, dry and free from foul emanations, our drinking water should be free from contamination of decomposed matter, our reservoirs should be well looked after and cleansed out every year, an infinitesimal dose of medicine is said to have wondrous effects upon the human system. Why then should not an infinitesimal dose of sewage have its peculiar effects. Our food should be wholesome and free from decomposition (that post prandial delicacy in the shape of decomposed cheese is given as one of the causes of enteric fever). Our sewers should be well flushed out at repeated short intervals especially in dry seasons. Judicious ventilation should be observed, and the sun should be allowed free access into our houses. Very few study the essentials of good health, to do so would entail a life of misery on some people.

The sanitary condition of the city has received the usual amount of attention, a bad spot is occasionally brought to our notice which often takes time to get it rectified—the work of the inspectors has been compiled for your notice, their reports are very satisfactory, and special attention has been paid to the market. When your officers get settled in their permanent building a better system of routine I think can be established. Breaches of the health laws have occasionally been brought before the magistrate. I should like to see your inspectors better supported in their work, by sufficient fines being imposed.

Milk Inspector Nixon reports having made 305 inspections and 150 passing visits. The number of cow-byres in the city is: 1st class, 3; 2nd class, 70; 3rd class 9; total, 82. Many of those rated second-class would rate first-class if they had proper sewerage arrangements and connections. The number of licensed dairies or places where milk is sold is 45; total number of licensed cattle, 246; unlicensed (belonging to private families) about 30.

With regard to the above classing of cow-byres I daresay that in taking a comparative standard of all the byres in the city, the above rating is correct, but in my own experience I have not yet seen a cow-byre which could rank as No. 1, and I would have great conscientious difficulty in rating them No. 2.

During the months of June, July, August, September and October, 445 samples of milk were examined at the health office, with the following results: 18 samples showed under 3 per cent. of fat; 19, 3 per cent.; 70, $3\frac{1}{4}$ per cent.; 150, $3\frac{1}{2}$ per cent.; 125, $3\frac{3}{4}$ per cent.; 29, 4 per cent.; 27, from 4 to $5\frac{1}{2}$ per cent.; 5, 6 per cent.; 2, $6\frac{1}{2}$ per cent.; percentage of butter fat $3.61\frac{1}{2}$; all the samples were examined with the Fesor lactoscope, the readings of which (when properly observed) taken in connection with the corrected specific gravity, determine with reasonable certainty the approximate value of milk whether very good or very poor. A few samples showing 6 per cent. and over of butter fat with the lactoscope were received at the office. The inspector informs me that on one occasion he saw the cows milked and took the sample himself. On Tuesday last, in company with the inspector, I saw the same cows milked and took the sample myself, having first stirred the milk well up. I examined it next morning when it showed $4\frac{1}{2}$ per cent. Between the taking of the two samples however the cows had not had their usual feeding of brewers' grains, but had mangolds instead. I do not think that brewers' grains have any specific value in the production of butter fat, but mangels produces poor milk. Notwithstanding all that has been said and written to discourage us in testing milk, we have still proceeded onwards, and as long as we satisfy the public we care very little how much may be said by a few interested individuals. There is no underhand work going on in the health office. I have never yet known, either by wink, nod or other means whose milk I was examining. The city cows, as a rule, give good milk, and I would recommend that all the country milk dealers should be charged \$5 for their license; they pay no city taxes and have the use of streets free of charge, the fee of \$1 is only a nominal fee. There are a few country dealers who have not complied with the by-law who send their milk to the Farmer's Dairy Co., the man who brings in their milk took out a license for his own milk. I would recommend that his license be taken from him while he continues to do so; it is not fair to some dealers who have complied with the by-law and have taken out their license. In accordance to your instructions I wrote to the health officers of the adjoining townships for their co-operation with regard to the inspection of milch cows and cow-byres. Some three or four answered my letters, the township of Barton made no reply. I am of opinion that any inspection made by a Hamilton inspector would, under the existing laws, be so much time and money wasted. I wrote last session to the Honourable the Provincial Secretary asking to give municipalities certain powers over their milk supplies coming from outside districts, I received a reply that it was too late in the session to do anything. I presume that as soon as the session opens that the matter will be taken into serious consideration. With regard to the taking samples of milk it is usual for the inspector to get the sample himself having first stirred up the milk, and take it from the centre of the can, those are the instructions I gave to your inspector. Why there should be any obstacle in carrying out these rules I do not know; if the inspector cannot help himself to the sample he has no right to give a duplicate sample, the latter is nothing short of a humbug anyway, if a milk standard was in existence and an analyst in the city there might be some reason for giving one. Your inspector informs me that there are only four milk dealers who dip the milk from the can, all the others supply it from the tap. Now if milk from the tap such as we have lately got shows such a good percentage of butter fat, is it not reasonable to suppose that all good milk would show a similar quality. It is rather strange that some of the milk examined by me never gave over $3\frac{1}{2}$ and sometimes as low as $3\frac{1}{4}$, was it by some

mysterious inspiration this man's milk was singled out to give it a low standard? I rather think that individual had better reasons for knowing why his standard was low.

The last hospital milk examined by me showed only $2\frac{1}{2}$ butter fat. I would recommend that the hospital physician should be supplied with a lactoscope to examine the milk every morning immediately on its arrival.

During last summer I received a circular asking questions regarding the spread of contagious diseases from cattle. I do not suppose that one medical man out of a hundred could answer them from his individual experience.

MORALITY IN HAMILTON IN 1889.

The mortality of Hamilton for the year 1889 brings the ratio of deaths down to the lowest figures yet attained in fourteen years. It numbers 651, which, with a population of 44,635, places the rate at 14.58. Four hundred and fifty-six were interred in Burlington cemetery, one hundred and thirty-four in the Roman Catholic cemetery, and sixty-one were removed to distant burial grounds. The total number of burials in Burlington cemetery was 597, which includes forty-one stillborn children and one hundred non-residents who do not comprise any part of our population. The total burials in the Roman Catholic cemetery were 149, which includes six stillborn children and nine non-residents. The following tables may prove interesting to some people. I am sorry, however, to say that a sufficient amount of interest does not appear to prevail to a very large extent. The causes of death when accurately given ought to teach us in what direction to extend our usefulness in diminishing mortality. The large number of deaths which occur among children under one year of age is remarkable, and is due more to misguided treatment at home than from the unsanitary conditions which may exist, although the latter might contribute to a certain degree. Of the 651 deaths, 275 are under twenty years of age; 230 are under five years, and 183 are under one year.

| | 1889. | 1888. | Difference. |
|----------------------|-------|-------|-------------|
| Under one year..... | 183 | 208 | 25 |
| One and under two .. | 34 | 39 | 5 |
| Two " three..... | 4 | 21 | 17 |
| Three " four..... | 4 | 22 | 18 |
| Four " five..... | 5 | 8 | 3 |
| Five " ten..... | 21 | 27 | 62 |
| Ten " twenty..... | 24 | 45 | 21 |
| | 275 | 370 | 95 less. |

The Chief Causes of Death of Children under one Year of Age.

| | 1889. | 1888. | |
|--------------------------|-------|-------|-----|
| Premature births..... | 15 | 27 | 12 |
| Debility..... | 30 | 29 | x 1 |
| Diarrhoeal diseases..... | 50 | 36 | x14 |
| Lung affection..... | 14 | 28 | 14 |
| Brain affection..... | 11 | 15 | 3 |
| Convulsions..... | 12 | 27 | 15 |
| Marasmus..... | 6 | 14 | 8 |
| Other causes..... | 45 | 32 | x13 |

Premature cases all died shortly after birth. Those from debility not exceeding a few weeks

Prevalence of Contagious Diseases by Wards.

| WARDS. | Scarlatina. | Diphtheria. | Typhoid fever. | Totals. | Ward population. | Ratio of cases per 1,000. |
|--------------|-------------|-------------|----------------|---------|------------------|---------------------------|
| 1..... | 21 | 7 | 8 | 36 | 3,997 | 9.00 |
| 2..... | 10 | 2 | 3 | 15 | 4,219 | 3.55 |
| 3..... | 27 | 14 | 18 | 59 | 7,029 | 8.37 |
| 4..... | 17 | 5 | 15 | 37 | 6,987 | 5.29 |
| 5..... | 13 | 9 | 26 | 48 | 6,650 | 7.21 |
| 6..... | 21 | 16 | 21 | 58 | 6,694 | 8.66 |
| 7..... | 52 | 4 | 21 | 77 | 9,059 | 8.50 |
| Totals..... | 161 | 57 | 112 | 330 | 44,635 | |
| Deaths | 4 | 10 | 11 | 25 | | |

Population south of King street, 15,245 ; rate, 7.21. Population north of King street, 29,390 ; rate, 7.48. Wards 4 and 5, 13,637 ; rate, 6.23. Wards 6 and 7, 15,753 ; rate, 8.56.

Prevalence of Contagious Diseases by Months.

| MONTH. | Scarlatina. | Diphtheria. | Typhoid fever. | Total. | Monthly Mortality, 1889. | | |
|----------------|-------------|-------------|----------------|--------|--------------------------|---------|--------|
| | | | | | Male. | Female. | Total. |
| January..... | 18 | 12 | 2 | 32 | 25 | 34 | 49 |
| February..... | 13 | 5 | 5 | 23 | 27 | 22 | 49 |
| March..... | 15 | 2 | 2 | 19 | 33 | 20 | 53 |
| April..... | 16 | 6 | 2 | 24 | 33 | 24 | 57 |
| May..... | 12 | 8 | 1 | 21 | 38 | 26 | 64 |
| June..... | 10 | 3 | 2 | 15 | 31 | 17 | 48 |
| July..... | 5 | 7 | 6 | 18 | 39 | 39 | 78 |
| August..... | 4 | 0 | 24 | 28 | 40 | 21 | 61 |
| September..... | 13 | 1 | 33 | 47 | 21 | 24 | 45 |
| October..... | 13 | 2 | 20 | 35 | 28 | 31 | 59 |
| November..... | 23 | 9 | 5 | 37 | 22 | 23 | 45 |
| December..... | 19 | 2 | 10 | 31 | 18 | 25 | 43 |
| Total..... | 161 | 57 | 112 | 330 | 355 | 296 | 651 |

Scarlatina—ratio per 1,000, 3.6.

Diphtheria—ratio per 1,000, 1.2.

Typhoid fever—ratio per 1,000, 2.5.

Comparative Statement of Population and Deaths for the Fourteen Years.

| YEAR. | City Mortality. | Population. | Death rate per 1,000. | Burial Grounds. | | |
|-------|-----------------|-------------|-----------------------|----------------------|-----------------------|-------------------------|
| | | | | Burlington Cemetery. | R. Catholic Cemetery. | Distant burial grounds. |
| 1876 | 688 | 31,708 | 21.69 | 483 | 170 | 35 |
| 1877 | 690 | 32,641 | 21.13 | 512 | 148 | 30 |
| 1878 | 599 | 33,511 | 17.86 | 120 | 131 | 48 |
| 1879 | 674 | 34,268 | 19.67 | 468 | 148 | 58 |
| 1880 | 626 | 35,009 | 17.88 | 449 | 127 | 50 |
| 1881 | 642 | 35,359 | 18.15 | 448 | 154 | 40 |
| 1882 | 657 | 36,346 | 17.78 | 469 | 142 | 46 |
| 1883 | 714 | 38,196 | 18.68 | 495 | 163 | 56 |
| 1884 | 687 | 39,216 | 17.51 | 486 | 150 | 51 |
| 1885 | 691 | 39,985 | 17.28 | 485 | 155 | 51 |
| 1886 | 767 | 41,280 | 18.57 | 535 | 178 | 54 |
| 1887 | 699 | 43,080 | 16.43 | 486 | 160 | 53 |
| 1888 | 749 | 44,299 | 16.9 | 534 | 162 | 53 |
| 1889 | 551 | 44,635 | 14.58 | 456 | 134 | 61 |

Non-residents and stillborn are excluded from our mortality.

J. RYALL, M.D.,
Medical Health Officer.

KINGSTON.

MEDICAL HEALTH OFFICER'S REPORT.

In submitting my annual report, I beg leave to state that during the early summer we had all premises, yards, cellars, etc., examined and cleaned out where necessary, disinfected and otherwise attended to. There were 471 permits issued during the year to clean out privy pits and thoroughly disinfect with lime after being emptied, from which was taken 22,000 cubic feet of excrement which was carted away, by the odourless system, into the country to be used upon the land.

The dry earth system is coming more into use. This system is regulated by a by-law passed by the corporation, under which a scavenger is employed to remove the matter at regular intervals, the fees for such removal is fixed at a cheap rate to induce owners and occupants to adopt this plan in preference to the pits which are at best a hot-bed of disease and no doubt the cause of a large proportion of the cases of contagious diseases in our midst.

The necessity of having tenement houses inspected, and those found unfit for occupation condemned, is apparent. Many houses exist in the city which are not fit for habitation, and which in many cases are occupied by large families.

During the year the sanitary inspector and myself have brought to the notice of the city council the necessity of causing drains required to be constructed, to be built under the supervision of the city engineer. By so doing we would have under our care the proper trapping, etc., necessary to all dwellings, and would now repeat this request.

I would recommend that cow-byres be not allowed within a certain area, say the present fire limits of the city, and no one be allowed to keep cows within the city without having first obtained permission from the Board of Health.

The Board of Health during the year closed up a number of wells for the reason that they were polluted by surface drainage, privy pits, and other causes which made the water unfit for use.

The city water works system is now about complete, the rates are very moderate and there is a prospect of a still further reduction. I hope the necessity of compelling citizens to close up bad wells will be a thing of the past, as bad water, like untrapped drains and decomposing filth, are dangerous to the health of the community, such being the prolific cause of typhoid fever, cholera, diarrhoea, etc.

Milk.—A lengthy by-law has been passed this year by our city fathers, taking this matter out of the hands of the Local Board of Health, with what results remains yet to be seen.

During the past year the city council, in their wisdom, widened Young street, which now will allow of abundant oxygen instead of foul air confined in a narrow lane. As the law at present requires the council's consent to the opening of new streets of a less width than 66 feet, I earnestly advise that no narrow streets be allowed, as they are a source of disease in many forms.

Systematic inspection during the summer was accomplished by sanitary police, by order of the mayor, and I must say that it was well done.

After having been called upon in many instances to examine houses where foul gases and unpleasant odours existed, arising from one cause or another, I am convinced the dangerous conditions in which I found many houses, occupied by families, were the result of culpable negligence or ignorance, or both on the part of plumbers. I am of the opinion that it would be in the interest of the public health were a by-law passed licensing and regulating plumbing, so that no plumber could secure a license who is not a thoroughly competent person.

The condition of our streets demands attention ; the depth of mud upon them shows they require to be scraped oftener than at present, if the health of the community is at all cared for.

The health of our city during the present year has been tolerably good ; we have, however, had a great many cases of malarial fever attributed to the very wet season and sudden changes of temperature.

SAMUEL H. FEE, M. D.,
Medical Health Officer.

LONDON.

MEDICAL HEALTH OFFICER'S REPORT.

"In presenting my fourth annual report upon the sanitary condition of the city for the year ending October 31st, it gives me pleasure to state that the health of the city during the year has been exceedingly good. Much good work has been done ; innumerable complaints have been attended to ; many have been compelled to connect their yards and premises with the public sewers. Forty-seven wells have been closed, and a large number cleaned. Sixty-eight samples of well water and ninety of milk have been analyzed at this office.

"Three hundred and sixty-five deaths took place during the year, as compared with 438 last year and 455 the year before. Estimating the population of the city at 27,000, this gives a death rate of 13.14 in the 1,000, compared with 16 last year and 17.16 the year before. The death rate has thus decreased in four years from 23 in the 1,000 to 13.14.

"The mortality from preventable diseases has also largely decreased. For example, there were only nine deaths from diphtheria this year, compared with fifteen last year. Of typhoid fever there were but four deaths this year, compared with eight last year. Consumption, as usual, carried off the largest number, being credited with 30. Cancer caused the deaths of 16 ; small-pox one, and scarlet fever none.

"The death from small-pox was that of a lady who had been visiting in Southwold a family, two or three of whose members were ill at the time, although the true character of the disease does not appear to have been suspected. Two days after her return she was attacked by a most virulent type of small-pox, and died on the fourth day. She had never been successfully vaccinated. Every precaution was taken to prevent the disease spreading. All those who had been exposed were vaccinated, and no more cases occurred.

"*Well Water and Typhoid Fever.*—A mild form of typhoid fever prevailed during the autumn months, which, with the exception of three imported cases and four doubtful ones, were all traced to the drinking of contaminated well water. In a former report the attention of the Board was called to the necessity, in the interests of the public health, of having all wells closed wherever the city water was available. To give an illustration of how these polluted wells spread disease, take the recent cases of typhoid fever on Oxford and George streets. Here, in a group of six dwellings, five families used well water, which, upon examination, was found to be wholly unfit for domestic purposes. These five families—fifteen persons in all—contracted typhoid fever, while the families living in the centre of the group used the city water, and remained entirely free from the disease. Seventy per cent. of all the wells examined in the city this year were found more or less contaminated. The finding of skeletons of rats, toads, and even cats, is not of infrequent occurrence. It would be interesting to know what had become of the soft parts of these animals. If the city council would cause these wells to be closed, or if necessary, obtain legislation to enable them to do so, it would very sensibly lessen the mortality from typhoid fever and diphtheria.

"*Sewers.*—A communication was sent from this office in March to the Board of Health, recommending the extension of the Dundas street sewer from Adelaide street one block east. The matter was referred to the city council with a recommendation that the work be done. It was found, however, that a majority of the ratepayers interested were opposed to the extension on account of the expense, and No. 2 Committee threw it out in consequence. This extension is very much needed, the population being dense and the drainage imperfect.

"*Carling's Creek.*—The water course known as Carling Creek is still the cause of sickness in that part of the city, and endless trouble to the Board of Health. Until recently the sewage from the barracks emptied into this creek, under the Elizabeth street bridge, where it became dammed up, to the annoyance of people living in that vicinity. At the request of the Board the commanding officer, under instructions from Ottawa, caused the drain to be moved so as to enter the creek below the bridge, allowing the sewage to flow along more readily. The creek drains an area of about one mile—from Dufferin Avenue on the south to St. James' street on the north, or fully three-fifths of the city. The absence of sewers in the northern parts of the city makes it still more imperative that some action be taken towards converting this creek into a trunk sewer. Leaving out of the question the fact that real estate is depreciated in value in this part of the city on account of this creek in its present condition, much unnecessary sickness and expense would be avoided and valuable lives saved. So long as there are plenty of rains to keep the creek well flushed the damage will not be so great; but let there come a dry, hot summer, and the mortality from typhoid fever and diphtheria would show the folly of allowing an open sewer like this to run almost through the heart of the city.

"*Isolation Hospital.*—If it is the intention of the Hospital Trust to erect a suitable cottage or ward for the reception of cases of infectious diseases, which should not be sent to the General Hospital, the work cannot be commenced any too soon. The deaths of four children recently in one dwelling on Adelaide street from diphtheria is an example of the necessity of promptly isolating first cases. It is certainly harsh and improper to shut up the healthy with the sick, subjecting all to the danger of infection, besides preventing the wage-earner from following his employment at a time when his family most need his help. By sending first cases to the isolation hospital, where they will have medical attendance, better nursing, better ventilation and sick comforts than in their own homes, where very often these necessities cannot be procured, their chances of recovery

will be much better, besides frequently relieving the city of the expense of providing for the families, and allowing them, after a few days' quarantine and disinfection, to resume their occupations.

"The inspection of milk, dairies, cow-byres and meat offered for sale on the market has been very thoroughly carried out, a report of which will be made at a future time."

T. V. HUTCHINSON, M.D.,
Medical Health Officer

OTTAWA.

MEDICAL HEALTH OFFICER'S REPORT.

In laying before you the report of the Health Department for the year ending October 31st, 1889, I have the pleasure to state that the general health of the city during that period has been fairly good and under the circumstances such as to compare favorably with other cities of this province. Though we have not been free from some of the forms of epidemic diseases, and notwithstanding the annexation to the city of a large territory much in need of sanitary reform, it is satisfactory to know that the death rate per thousand of the population for the last twelve months has been somewhat less than that of the previous year.

From the mortuary tables here appended, shewing in detail the various causes of death, it is evident that the number of victims from preventable diseases is as yet much larger than it should be. That this to a large extent is the result of defects in the sanitary condition of our city that will at the earliest possible moment receive the favorable consideration of the municipal authorities there seems to be no reasonable doubt. That this result is partly due to ignorance or wilful neglect to observe the rules and regulations of this department must also be admitted. Among the contagious diseases which prevailed more or less extensively during the year that justly dreaded malady diphtheria stands prominently, having made in the very first month of the year more victims than any previous month in the history of this city. Though propagated by personal infection chiefly, it is admitted by those best informed on the subject that this disease generally has its origin in the evil effects of defective house plumbing and draining.

Whooping-cough and measles, the first of which is hardly controllable, were also very prevalent during the latter part of the winter and spring months and to a limited extent contributed to swell our death roll, as is shown in comparative table of deaths from zymotic diseases appended; in which also appears our comparative immunity from scarlet fever during the same period.

Typhoid fever was somewhat more prevalent during the last season than during the previous one, especially in that section lately annexed to the city. This in my estimation was largely owing to the well water used by the inhabitants of that locality for household purposes, and in all probability partly due to the excavations there made this season for the extension of our water supply, a work of immense importance in a sanitary point of view, notwithstanding the temporary evil effects its execution may have been productive of, which the people of that locality will early appreciate.

The hospitals for the isolation and care of contagious diseases have been maintained throughout the year on a satisfactory footing of efficiency. The enforcement of the law as regards the isolation of such cases in these institutions still receives much vexatious opposition, and this is the more to be regretted in as much as the most stubborn generally are those parties who on account of their circumstances would benefit most by this measure of safety which after all is the only reliable one in nine cases out of ten to prevent the spread of such infection, to guard the interest of the community as well as to secure the safe recovery of the infected. The number of cases admitted and cared for in these hospitals during the year is shown in an appended table in which also appear the deaths resulting therefrom.

The number of epidemic diseases reported to this department during the year were as follows :—

| | |
|--------------------|------------|
| Diphtheria | 134 |
| Measles | 143 |
| Scarlet fever..... | 8 |
| Typhoid fever..... | 67 |
| Total | 352 |

I regret that I cannot look upon these figures as very reliable, with the exception perhaps of diphtheria which may be nearly correct; the law requiring that the Health Department be notified of the existence of any such case, I fear is yet in many instances ignored.

Whatever may have been the differences of opinion in the past as regards the purity of our water supply, the palpable defection latterly of the clear water-pipe left no reasonable ground for further delay or hesitation to bring about such alterations as would seem best for the public good.

That the municipal authorities have met the situation promptly and effectively so far as it lies in their power by taking immediate steps to replace the decayed intake pipe yet in use by a metallic one and extending the same far beyond the present inlet, is a subject upon which I may justly congratulate the public.

Whilst recognizing the importance of pure air and pure water for the maintenance of health, it would be folly to neglect the food upon which we depend for nourishment. To secure purity in milk alone as an article of food, more especially for the little ones almost solely dependent upon it, is admittedly of paramount importance and it would no doubt go far towards the prevention of infantile diarrhoeal diseases generally so prevalent during the summer season.

With this object in view your board have recommended and the city council has passed, in September last, By-law No. 993, entitled a By-law respecting the Public Health By-law, which I feel confident will enable us to better control and regulate the sale of this article in this city.

Through seemingly uncontrollable circumstances which have prevented us from making as rapid sanitary progress as would have been the earnest wish of all who are most anxious to secure the well being of the community, it is but justice to record the completion during the year of such public works as the Richmond Road sewer, the Rideau Ward sewer and St. Andrew Street drain, all of which are works of vast importance in a sanitary point of view. That the past year has also been individually one of satisfactory sanitary progress may be gathered from the sanitary inspector's report here appended, to which I beg to refer you for details as regards the abatement of nuisances, the removal of household refuse and ordinary garbage and the removal of night soil. In the discharge of the duties devolving upon this office, even though it be a repetition of what has been urged in past reports, I cannot close this without stating that so long as the necessary facilities are not given private individuals to put dwelling houses and their surroundings in that sanitary condition which can only be secured by the construction of public drains wherever wanted and the organization of a proper system of scavenging throughout the city, just so long will our death roll be longer than it should be. That these sanitary defects, causing as they do yearly loss to the state as well as severe loss and sore affliction to many families, are grievances the municipal authorities are in duty bound to remedy at the earliest possible period of time is beyond question.

As bearing upon this important matter, allow me to draw your attention to a fact also apparent in the sanitary inspector's report which cannot be overlooked: that at least one-half of all the unsanitary conditions complained of are either directly or indirectly the outcome of defective plumbing or drainage or both, or the result of the want of public drains. A strong plea it must be admitted, not only urging the completion of

subsidiary drains, but a strong plea also for the most vigilant supervision of such works, either private or public, by a competent person in connection with this department. Though the sanitary inspector takes cognizance of all complaints, taking also the necessary steps to procure their abatement, he cannot superintend the work necessitated nor can he in many instances control it when finished. As a consequence the unfortunate citizen, let him be ever so anxious to secure the well-being of his household or however willing he may be to comply with the requirements of the laws of health and to conform to the rules and regulations of this department, he is at the complete mercy of those who in many instances are either ignorant or careless of the consequences of their defective workmanship.

A. ROBILLARD, M.D.,
Medical Health Officer.

ST. THOMAS.

MEDICAL HEALTH OFFICER'S REPORT.

It gives me pleasure, as Medical Health Officer, to present my annual report and in so doing to be able to state that our city has been more than ordinarily free from contagious diseases during the year.

Although 35 cases of scarlet fever have been reported to me, they were nearly all of a mild type, and no deaths resulted.

Of diphtheria ten cases were reported and one death.

The common forms of fevers have been frequent, but only one case of typhoid was reported to me during the ten months.

The usual placarding and preventive measures were exercised in all cases of contagious diseases reported.

The mortuary statistics for the Dominion during the year 1889, show the death rate percentage for the city to be as low or lower than any of equal population in the Dominion.

In the month of February, small-pox broke out a few miles west of St. Thomas, resulting in a large percentage of deaths, but no doubt owing to the energetic measures adopted by our Board of Health in establishing quarantine and guarding all points of entrance into the city from the infected district, we were happily saved from an invasion of this dread disease.

The mayor having issued a proclamation for compulsory vaccination, I visited all the public schools and found over 1,100 pupils with certificates of successful vaccination and in addition vaccinated 400, also about 100 city poor were vaccinated by me.

Vaccination of the citizens and R. R. employées was general.

The Secretary of the Provincial Board visited the city at this period. A more commodious and comfortable quarantine hospital was erected than the one formerly secured for that purpose, but I am thankful to say it has not yet been required.

During the year the sanitary inspector has made a house to house inspection, and reports some improvements in condition of cellars, backyards, outhouses, etc.

The city has not yet a common supply of water for household use. That for fire and mechanical purposes has thus far been adequate. Considering the lack for domestic use, the general health of the city has been remarkable and I attribute it largely to the good drainage, several thousand feet of additional sewer pipe having been laid this year.

I am of the opinion that the death rate would be still lower if a pure water supply was general.

J. B. TWEEDALE, M.D.,
Medical Health Officer.

ST. CATHARINES.

CHAIRMAN'S REPORT.

In accordance with the provisions of the Public Health Act, I have the honor to submit the annual report of the Local Board of Health of the city of St. Catharines for year ending 30th November, 1889.

I am much pleased to be able to report the general health of the city improved, and much better than last year. Upon examination of the statistical report of the city clerk, I find the percentage of death is reduced.

It is also a gratification to know that our Board has not been obliged to incur any extraordinary expenses, beyond the usual charges for burying dead animals, printing accounts, allowance to caretaker of hospital building, and the salary of sanitary inspector, thereby enabling the board to keep the expenditure within the appropriation of five hundred dollars.

Our Board has been called upon to provide room, and other necessary treatment for a patient that had been placed in the General Hospital, who owing to an infectious disease, had to be removed. This is an expense that would not have occurred if proper arrangements had been made with the hospital directors, to have a building set apart for that purpose, as per report made to our council last year. Our Board consider this is a matter which should receive the council's earliest attention.

The extension of the water works having been commenced, our Board contemplate after a reasonable time has elapsed, to order all wells existing where the city water can be obtained to be closed. There is no doubt quite a benefit has been derived from drainage done in some localities, and our Board would respectfully suggest that the drainage system be continued, especially in localities where immediate benefits are likely to be expected.

The King and Queen Street sewer has been a source of considerable annoyance during the past season. At the request of our Board the superintendent of water works has kindly ordered the sewer flushed upon two or three different occasions. The Board think it desirable that some arrangement be made whereby this sewer could be automatically flushed out at regular intervals of at least once a week during the hot season.

The sanitary inspector has performed his duties satisfactorily, and without having to resort to any harsh measures. He has caused a large amount of sanitary work to be done.

There were reported to the city clerk during the year 77 cases of infectious diseases, only 12 of which proved fatal. The total deaths from all causes was 158, from this number I deduct 32 deaths which occurred from causes not connected with any special disease. As follows, 13 still born, 5 premature birth, 3 accident, 9 old age, 1 poison, and 1 suicide. Making the total deaths from diseases of various kinds 126, or a death-rate for the year 1889 of 12.6 per 1,000. This is the best showing the city has made for a number of years, and much better I believe than reported in other cities, owing no doubt to a more general use of city water, and sanitary work executed through the exertions of our Board.

The lock No. 2 pond which the council has for some time been endeavoring to have the Dominion Government either fill up or deepen, the impression having gone abroad that said pond was in an unsanitary condition, our Board on the 15th February last passed a resolution requesting the Government to proceed with the work, and sent a memorial to that effect. I received an answer in reply to our request from A. P. Bradley, Esq., secretary of the Department of Railways and Canals, stating, that the matter was then before the chief engineer of canals with a view of remedying the evil complained of. The contract for deepening pond has been let to Capt. James Murray, who is now engaged in doing the work.

There has been some dissatisfaction expressed with regard to the manner which the work was being done, or more particularly the way of depositing the material on shore line of pond. I presume the contractor is doing the work in accordance with the specifications of his contract, given him by the chief engineer of canals over whom we have no control.

As there is a diversity of opinion among citizens, as to the propriety of doing the work in the way it has been done, and the evil effects or otherwise, I invited Dr. Bryce, secretary of the Provincial Board of Health, to come here and visit the locality, and give us the benefit of his opinion, which I trust will be satisfactory to all concerned, and be the end of all discussion *re* the celebrated lock 2 pond.

There are, however, other ponds within the city limits which our Board intend to investigate at an early day, and if found to be malarial will at once call the attention of of the Government to the fact.

S. G. DOLSON,
Chairman.

TORONTO.

MEDICAL HEALTH OFFICER'S REPORT.

I have the honor to present a final report for the departmental year 1888-89, which is supplementary to the monthly statements already submitted, and a summary of the year's work. Without traversing the ground of the monthly reports, it is deemed proper to refer to some points which can more conveniently be dealt with at the close of the year. At such a time it is well to take stock, as it were—notice what has been accomplished, what requires to be done, and the best means of securing the desired end. No one but those engaged in the work can understand fully the extent of the work which has been done, the difficulties encountered and overcome, and the reason why every effort to obtain sanitary reform has not been crowned with success. Many of these are, however, explained in the reports which from time to time have been made to the Board, and it is not intended to dwell upon them now; except to remark that it is manifestly unjust to blame the department when alarms arise, for the existence of evils which have been repeatedly pointed out, and which the department has been powerless to remove.

Since the Public Health Act came into force five years ago, the condition of the Medical Health Department has been one of growth and development. At first, it must be remembered, the public and the authorities failed to recognize the importance, even the necessity, of any sanitary reform. Gradually, however, a change has taken place. Although the warnings given of insanitary evils were at first unheeded, ultimately the danger became apparent, and the requirements of the department to deal with insanitary evils have in a measure been provided; but much remains undone. There is no longer an open sewer traversing the University Grounds under the name of a "creek." The most of the "Garrison Creek" has likewise been superseded by a proper sewer; also Rosedale Creek will soon be a thing of the past; but we have a so-called water front, which is in reality a stretch from dock to dock of sewage slightly diluted with water, which is at once disgusting to look at, offensive to smell, and a breeding place for the germs of disease.

Although it is several years since the necessity was pointed out of having an eastern and a western channel into Ashbridge's Bay, that the lake water might flow in so as to at least dilute the filthy water of the bay, only one channel is yet constructed, while the quantity of sewage poured into the bay is constantly increasing. Drainage to houses has

been obtained to a large extent (135 during the last year, not including new buildings) but there are still a good many dwellings without house drainage, the slops of which are thrown in the yards or street to pollute the air.

One hundred and forty-three privy pits have been closed, but a large number remain, from which emanate the seeds of disease. Most of the wells have been closed or are no longer used, but in a few places water which cannot be otherwise than polluted is still in use. Contrary to the provisions of the Public Health Act, and contrary to recognized health laws, garbage is still deposited to level up low lots, or to help in making land. Strenuous efforts have been made during the past summer to put a stop to this great evil, with only limited success. But these efforts, as in many other cases, are like cutting off the branches of a tree when the tree itself should be uprooted. It is impossible to remedy the evil until provision is made to destroy by fire all garbage, including the refuse of the slaughter houses, decayed vegetables, stale fish, dead animals, and such manure as may not be required for fertilizing purposes. In a word, all refuse organic matter which, in the process of decomposition, is likely to form a breeding place for the germs of disease. Much has been done in the way of filling up the beds of stagnant pools in the bed of Garrison Creek and elsewhere, but beside the water front and Ash-bridge's Bay, there is the bed of the old Don full of reeking filth, and a serious menace to the public health.

During the past season the sanitary condition of the Island has been maintained in a more satisfactory manner than in previous years; but until all the lagoons are either filled with sand or connected with the bay by two channels to permit a current, there will be an ever-increasing source of danger to the public, and until there is a garbage furnace to destroy all refuse, organic matter and excrement, there will inevitably be foul smells, so that the Island, instead of being a health resort, will cease to be a place of attraction to the citizens and strangers.

Efforts are being made to have the slaughter houses placed and kept in such a condition that they may be the least possible source of danger, but the only effectual way to obtain protection of the public health is to establish a sufficient number of abattoirs.

That cow-byres are still allowed to exist within the city bounds is an indication that the public does not realize the fact that Toronto is no longer a village or small city, but a metropolis of goodly proportions, requiring corresponding conditions.

Turning to infectious and contagious diseases, in the management of which the Medical Health Department is much less handicapped, it can be recorded that substantial gain has been obtained. With regard to smallpox, not a case has occurred during the year. At the close of the previous year the disease had just been stamped out by vigorous measures. It is worthy of record, as it is a cause of gratification that the disease which had in a brief period appeared in seven different places, neither case originating from either of the others, but introduced from abroad, was effectually suppressed, and the means adopted by the department to prevent its spread ample and efficient. Even contrary to expectations no cases have subsequently occurred.

By turning to the tabulated statements of infectious diseases reported, and of mortuary returns for the last three years, it will be seen that the number of cases of typhoid fever has increased in about the same ratio as the population, but relatively has not increased. The number of deaths from this disease has decreased, notwithstanding the increase of population, from 68, the number three years ago, to 49. The number of cases of scarlet fever reported in the same time increased from 97 to 121, which is a relative decrease considering the increase of population, while the number of deaths from this disease is one less than three years ago. But the most striking record is that relating to diphtheria. The number of cases three years ago was 625, the number two years ago was 490, and the number for last year 350.

The rate of mortality in the same period is respectively for the three years 202, 133 and 72. In this connection the following statements recently published may be quoted. The *Empire* says: "The mortuary statistics for October indicate a far healthier condition "of the large cities than has been the case for some months past, and Toronto's propor-

"tion is astonishing, being but one per thousand, as against Montreal's 2.21, Quebec 2.61, Hamilton 1.55, Ottawa 1.53, Halifax 1.29, London 1.05, Winnipeg 1.71, Kingston 1.44, Brantford 1.42, Belleville 84, St. Thomas 1.22, Guelph 1.42, Woodstock 1.72, Windsor 1.51, Chatham 1.29." The *Mail* also vouchsafes this announcement: "The mortuary statistics for October show a general improvement in all the cities. Ottawa's ratio per thousand was 1.53, quite a drop compared with previous months. Montreal's figures were 2.21, Toronto the unprecedentedly low rate for a large city of "one per thousand." In view of these facts the Local Board of Health may be congratulated, while the Medical Health Department feels encouraged to continue the efforts which have in the past been made to preserve the public health.

Infectious Diseases Reported by Physicians for the last Three Years.

| Month. | Typhoid Fever. | | | Diphtheria. | | | Scarlet Fever. | | |
|----------------|----------------|------|------|-------------|------|------|----------------|------|------|
| | 1886 | 1887 | 1888 | 1886 | 1887 | 1888 | 1886 | 1887 | 1888 |
| November..... | 13 | 18 | 36 | 77 | 78 | 46 | 13 | 9 | 24 |
| December..... | 1 | 17 | 31 | 59 | 61 | 71 | 8 | 12 | 24 |
| | 1887 | 1888 | 1889 | 1887 | 1888 | 1889 | 1887 | 1888 | 1889 |
| January..... | 13 | 10 | 19 | 50 | 47 | 47 | 18 | 9 | 25 |
| February..... | 6 | 10 | 22 | 57 | 48 | 37 | 13 | 7 | 19 |
| March..... | 3 | 9 | 8 | 42 | 37 | 34 | 15 | 16 | 12 |
| April..... | 7 | 6 | 8 | 55 | 33 | 19 | 3 | 8 | 20 |
| May..... | 2 | 10 | 7 | 53 | 21 | 19 | 5 | 10 | 20 |
| June..... | 5 | 2 | 6 | 36 | 20 | 16 | 9 | 15 | 14 |
| July..... | 8 | 5 | 15 | 34 | 30 | 12 | 4 | 10 | 8 |
| August..... | 37 | 23 | 30 | 41 | 33 | 6 | 1 | 1 | 8 |
| September..... | 46 | 77 | 56 | 60 | 37 | 15 | 6 | 9 | 18 |
| October..... | 52 | 64 | 65 | 61 | 45 | 28 | 2 | 11 | 29 |
| Totals..... | 193 | 251 | 303 | 625 | 490 | 350 | 97 | 117 | 321 |

Mortuary Returns for the last Three Years.

| Month. | Typhoid Fever. | | | Diphtheria. | | | Scarlet Fever. | | |
|----------------|----------------|------|------|-------------|------|------|----------------|------|------|
| | 1886 | 1887 | 1888 | 1886 | 1887 | 1888 | 1886 | 1887 | 1888 |
| November..... | 3 | 3 | 9 | 15 | 13 | 4 | 1 | .... | .... |
| December..... | 1 | 7 | 3 | 17 | 14 | 12 | 1 | 2 | 1 |
| | 1887 | 1888 | 1889 | 1887 | 1888 | 1889 | 1887 | 1888 | 1889 |
| January..... | 4 | 1 | 4 | 19 | 23 | 20 | 3 | .... | 2 |
| February..... | 4 | 3 | 4 | 12 | 12 | 11 | .... | .... | .... |
| March..... | 5 | 2 | 6 | 11 | 14 | 5 | 1 | 1 | .... |
| April..... | 2 | 1 | 1 | 24 | 8 | 3 | .... | 1 | 1 |
| May..... | 5 | 3 | 1 | 21 | 4 | 3 | 1 | 1 | 1 |
| June..... | 6 | 3 | .... | 10 | 8 | 2 | .... | 1 | .... |
| July..... | 1 | 1 | 1 | 20 | 10 | 3 | .... | 1 | 1 |
| August..... | 5 | 4 | 4 | 21 | 10 | 2 | .... | .... | .... |
| September..... | 9 | 13 | 8 | 17 | 9 | 4 | .... | .... | .... |
| October..... | 23 | 9 | 8 | 15 | 8 | 3 | .... | .... | .... |
| Totals..... | 68 | 50 | 49 | 202 | 133 | 72 | 7 | 7 | 6 |

Management of Infectious Diseases.

| Month. | Number of cases reported from all sources. | Number of visits for the month. | Places visited in connect'n with contagious diseases. | Number of funerals attended. | Number of dissections made. | Number of patients removed in ambulance. | Number paid for ambulance. |
|---------------------|--------------------------------------------|---------------------------------|-------------------------------------------------------|------------------------------|-----------------------------|------------------------------------------|----------------------------|
| November, 1888..... | 234 | .... | .... | .... | .... | .... | .... |
| December, 1888..... |  | .... | .... | .... | .... | .... | .... |
| January, 1889..... | 112 | .... | .... | .... | .... | 8 | 7 |
| February, "..... | 78 | 275 | .... | 3 | 4 | 15 | 7 |
| March, "..... | 57 | 353 | .... | 2 | 8 | 3 | 2 |
| April, "..... | 47 | 262 | 30 | 1 | 10 | 5 | 3 |
| May, "..... | 48 | 226 | 47 | .... | 14 | 3 | .... |
| June, "..... | 37 | 247 | 35 | .... | 10 | 4 | 1 |
| July, "..... | 37 | 172 | 36 | 1 | 7 | 2 | .... |
| August, "..... | 43 | 182 | 42 | 3 | 2 | 5 | 2 |
| September, "..... | 88 | 320 | 91 | 1 | 4 | 6 | 3 |
| October, "..... | 124 | 591 | 123 | 1 | 10 | 11 | 5 |
| Totals..... | 905 | 2,628 | 404 | 12 | 69 | 62 | 30 |

AMBULANCE FOR INFECTIOUS DISEASES.

The ambulance, which has belonged to the Department since the 10th January, has proved to be a great advantage over the previous arrangement. All cases of infectious disease are now removed by an officer of the Department. A nominal charge of one dollar is made to such as are able to pay. When the person is unable to pay, he is removed free of charge.

HOUSE TO HOUSE INSPECTION.

This has been done almost altogether by the sanitary police, eight in number, who began work on the 8th April. The work of inspection began at the front of the city from the eastern to the western limit, and proceeded northward. It was expected that the greater portion of the city would have been traversed by the inspectors, but the very large number of complaints to be attended to prevented this, and in not more than one-third of the city has house to house inspection been made. It may be well to remark that the time spent by inspectors in looking after the abominable privy pits (which is probably two-thirds of the whole time of work) which it has so often been urged should be entirely abolished, would have enabled the inspectors to visit every house in the city.

The following table exhibits the result of the house to house inspection for the year :

SANITARY IMPROVEMENTS AS EFFECTED BY THE SANITARY POLICE DURING THE YEAR.

| | Totals. |
|-------------------------------|---------|
| New water closets | 366 |
| Water closets repaired..... | 113 |
| New drains put in..... | 135 |
| Drains repaired | 160 |
| Privies cleaned..... | 2,053 |
| Privies repaired..... | 117 |
| Privies abolished | 143 |
| Dry earth closets put in..... | 53 |
| Yards cleaned..... | 804 |
| Cisterns filled | 105 |

| | Totals. |
|--------------------------------------------|---------|
| Wells filled..... | 18 |
| City water put in..... | 33 |
| New sinks put in..... | 47 |
| New traps put in..... | 71 |
| Waste pipes repaired..... | 121 |
| Water pipes repaired..... | 85 |
| Cellars drained..... | 52 |
| Cellars cleaned..... | 148 |
| Eavetroughs, etc., repaired..... | 60 |
| Stables cleaned..... | 142 |
| Slaughter houses cleaned and repaired..... | 17 |

The above table shows work done in connection with the house to house inspection, and is not included in the work elsewhere given in connection with complaints.

SPECIAL INSPECTIONS DURING THE YEAR.

Milk Inspection.—Total number of inspections made, 2,563. The reports were mostly satisfactory, a few, however, had to receive further attention. Each dealer was notified "that a permit must be obtained from the Medical Health Officer, as well as a license from the inspector of licenses, and that in order to obtain the license the permit must be shown to the inspector of licenses."

Cow Byres—Total number of inspections, 554. Of these 515 were found satisfactory. The others were duly attended to.

Livery and other Stables.—Number of inspections made, 143. Of these 139 were found satisfactory. The others were treated as complaints.

Slaughter Houses.—Number of inspections, 314. Of these 283 were reported to be in a fair sanitary condition. The others received further attention.

Sausage Factories.—Total number of inspections, 112. Of these 109 were found in good condition, while the others were dealt with as complaints.

Rag and Bone Shops.—Total number of inspections 44. Of these 31 were found satisfactory. The others received the necessary attention.

Industrial Establishments.—Total number inspected, 229. Of these 208 were found satisfactory. The others received the necessary attention.

School Buildings.—The Public School buildings, 39 in number, and those of the Separate Schools, 13, were inspected in the spring, and again before the opening of the schools on the first of September, also Upper Canada College, Collegiate Institute, the Normal and Model Schools. The inspector was directed to "report as to the sanitary condition of the buildings and premises; the kind and condition of privy closets and urinals, also respecting the water supply and drainage." The reports after inspection in the spring made it necessary to call the attention of the Public School Board, as well of the Separate school, to the unsanitary condition of certain school premises. The reports of the inspections made in August were satisfactory.

Care of Infant Children.—In accordance with the "Act for the Protection of Infant Children," the premises of 19 applicants for license have been inspected by the Medical Health Officer, since the first of January. Of these, 14 were found satisfactory, and authority given to the inspector of licenses to register the same. The others not being suitable, the applications were refused.

Rosedale Creek.—This stream is in reality an open sewer until the point is reached where the new sewer is constructed. It has required a good deal of attention during the season. In the spring and again in July, the more solid material found in the stream was cleared out and buried. Disinfectants have also been used from time to time with the object of diminishing the foul emanations. The completion of this sewer as speedily as possible is imperatively demanded.

Refuse, Garbage, etc., from Hotels, Restaurants and Clubs.—In all, 114 places were inspected. Of these, 77 were found satisfactory. The others received the required attention; and in one case the proprietor had to be summoned before the police magistrate in order to secure the removal of the evil.

Privy Closets and Urinals at Hotels, Taverns and Saloons.—Inspection of 124 places showed 109 to be in a satisfactory condition. The others were dealt with as complaints

COMPLAINTS BY CITIZENS AND INSPECTORS.

The inspectors were instructed, in making house to house visits, that "when a place was found in an unsanitary state, for which the owner or agent was responsible, it was to be made a citizen's complaint, and the owner or agent at once notified on the form prepared for the purpose, and report if possible what he will do in the matter."

In like manner in making special inspections, every place found unsatisfactory was classified with citizens' complaints.

In dealing with these complaints, from whatever source, a uniform course is pursued. Having ascertained who is the responsible party, whether the occupant, owner or agent, he is notified of the nature of the evil found to exist, and it is learned whether he will abate the nuisance. In many cases this is sufficient to secure removal of the evil. When there is unnecessary delay in attending to the matter, he receives a formal notice stating the nature of the complaint and what requires to be done within a specified time, or the law will be enforced. The next step, when necessary, is to issue a summons to appear before the police court for infraction of the Public Health Act.

The following is a statement of the management of complaints during the year :

| | |
|-----------------------------------------------|--------|
| Total number of complaints, about..... | 6,000 |
| Visits made in connection therewith..... | 18,000 |
| Total number of notices served..... | 1,422 |
| Inspections after notice had been served..... | 5,473 |

CASES IN COURT DURING THE YEAR.

| | |
|----------------------------------|---------|
| Number of prosecutions..... | 234 |
| Number of remands..... | 581 |
| Cases withdrawn (work done)..... | 170 |
| Cases dismissed..... | 9 |
| Fines imposed..... | 12 |
| Amount of fines..... | \$54 00 |

RECOVERY OF COSTS FOR WORK DONE BY THE DEPARTMENT.

The Public Health Act provides that in case of serious evils existing in any place, dangerous to the public health, and it is found impossible for any reason to compel the party responsible to remove the evil, the Local Board of Health may have the necessary work done and recover costs therefor from the property in proper course of law. During the year three such cases have been dealt with by the department. In the first case judgment has been recovered against the owner for the expenses of abating said nuisances. Execution is now in the sheriff's hands, and as a sale is about to take place by a mortgagee, it is expected that the amount of the judgment will soon be realized. The other two cases are now in the hands of the city solicitor, who is proceeding against the owners of the property to recover from them the amount it cost to abate the nuisances. The total cost of abating the nuisances above mentioned is over \$230.

In this connection it is proper to state that the department is under obligation to the city solicitor's staff, not only in these cases, but in many others for prompt advice in the management of police court cases.

MISCELLANEOUS WORK.

Supervision of the Cutting of Ice and its Sale.—The fact that ice of two qualities was stored by the same dealer, one quality being for consumption, the other for cooling purposes only, made the work of the inspector extremely difficult. The unscrupulous conduct of some of the dealers deserves the reprobation of the public whose health it is desired to protect. In the Monthly Report for April it was stated, "It will be necessary to 'closely watch the ice wagons during the season to prevent the use of impure ice in a manner to jeopardize the health of the consumers, and an inspector will be specially detailed for that purpose.'" The following promise was signed by the dealers: "I, ———, do solemnly promise that the ice I take from Ashbridge's Bay shall be sold for cooling purposes only, and not to be used in any way by which the melted ice might be drunk, or come in contact with food; and that I will have a printed notice upon the delivery wagon stating, 'for cooling purposes only,' to be furnished by the Medical Health Department."

Notwithstanding this promise some of them unblushingly and systematically endeavored to thwart and deceive the inspector, and to dispose of impure ice as that fit for consumption. In several cases it was necessary to notify those to whom ice was supplied, of the dangerous quality of the ice they were receiving from unscrupulous vendors. For the future it is believed the steps which have been taken will secure protection to the public with regard to the use of ice polluted with sewage and other organic matter.

Dredging of Church, Yonge and Brock Street Slips.—As was done last year, these slips were again dredged out before the hot weather arrived. From Yonge and Church Street slips a large quantity of foul semi-solid matter was taken. From Brock Street slip a considerable quantity was also taken. The dredge was at work in all 128 hours, 58½ hours at Church Street, 40½ hours at Yonge Street, and 29 hours at Brock Street. An inspector was specially detailed to supervise this work, to see that it was properly done. He reported that the work had been done in a satisfactory manner.

Removal of Night Soil.—At the beginning of spring an inspector was directed to "make inquiries and report the names and addresses of all persons engaged in cleaning privy pits, the condition of the waggons and barrels, the places where night soil is deposited, and if deodorizers are duly and properly used in each case attended to." The reports were in the main satisfactory.

The excavators have been repeatedly notified that in no case may a privy pit be only partially emptied; but from time to time this rule has been violated owing to the desire of property owners to limit the expense when called upon to attend to a full privy. The danger attending the partial removal of the contents of a privy pit has been repeatedly pointed out. It is a matter for regret, and caused a great deal of trouble to the department that the service for removal of night soil has been, and remains altogether inadequate. Orders for work have remained on their books for several weeks unattended to, while complaint after complaint was made at the office of the evil which, meanwhile, we were powerless to remove.

Closets and Urinals at Railway Stations.—An inspection of the several railway stations in the city showed three to be in an unsatisfactory condition. These were duly attended to.

Houses unfit for Human Occupation.—During the year seventeen places used as dwellings were condemned. It became necessary to take legal steps to have the occupants evicted, and in some cases they had to be summoned before the police court in order to obtain the required end.

Island Sanitation.—During the season an inspector visited the Island nearly every day of the week. A person was engaged to remove from the Island the garbage of all public places and from such private houses as placed their garbage convenient for removal. This was done twice each week. In addition to this, for a time a scavenger was employed to take the garbage from the private dwellings.

Flushing Sewers.—Complaints of foul smells from the manholes have been very frequent of late. In most cases it has been found that decomposing organic matter exists in the sewer, and that flushing was necessary. The engineer's department was at once notified of the fact, and flushing the sewers was duly made by that department. In certain parts of the city this evil is more common. It would be well if a general flushing was done systematically, especially where there is little or a sluggish flow through the sewer.

Applicants for Hospital Relief.—The total number of applicants for the year was 1,397. Of these 1,111 were admitted.

Convalescent Home.—During the year 156 applicants were admitted to this institution.

The Staff of the Medical Health Department.—As organized a year ago on the recommendation of the Medical Health Officer, have proved themselves well capable of discharging their respective duties. With little exception all have given due satisfaction, and deserve the commendation of the Board.

In concluding this annual report, I wish to refer with gratitude to the constant harmony which has subsisted between the Board and the department, and the cordiality which has been maintained between the chairman and members of the Board and their executive officer. It may be safely said that the year has been one of the most satisfactory experienced since the organization of a Local Board of Health for Toronto.

It is gratifying to state that the policemen who have been attached to the staff during the season have rendered very important service to the Department.

All of which is respectfully submitted.

WM. OANNIFF, M.D., M.R.C.S., Eng.,
Medical Health Officer.

TOWNS

BARRIE.

SECRETARY'S REPORT.

I have the honour to report that meetings of the Local Board of Health, up to August last, were frequent, regular, and well attended, the members taking a lively interest in their duties. No medical health officer was appointed, such officer being deemed unnecessary.

A few cases of diphtheria occurred, (one, at least, being fatal) also one or two cases of typhoid during the year. Otherwise the health of the town was, as usual, good.

The sanitary inspector attended closely to his duties. A few cases of nuisance were ventilated in the police court and their removal effected.

A by-law licensing and regulating milk vendors, and for the inspection of milk, at the instance of the Board, was passed by the council, and will, I have no doubt, have a beneficial effect.

A portion of the town is drained by underground tile and wood drains but no complete system of drainage exists.

The domestic water supply is chiefly obtained from wells of the shallow kind, although a large number of people are supplied from artesian wells.

Steps have been taken to meet deficiencies in this respect, and last summer Mr. Chipman, C.E., was appointed to investigate and report upon a water supply and drainage system.

All the preliminary work is now through with, and before long his report will be in the hands of the council, and in all probability before another year Barrie will be abreast of the time in the matter of drainage and sewerage.

HENRY BIRD,
Secretary.

BOWMANSVILLE.

MEDICAL HEALTH OFFICER'S REPORT.

The sanitary condition of our town is most satisfactory and gratifying.

No epidemic has visited us during the year, and only two isolated cases of typhoid fever have been reported.

We have escaped diphtheria so far, and the other zymotic diseases have not appeared in our midst.

E. C. McDOWELL, M.D.,
Medical Health Officer.

BOTHWELL.

SECRETARY'S REPORT.

The Local Board of Health beg to submit the following report :

That we find the town in a fair sanitary condition, and its inhabitants free from any infectious diseases.

The Board has received no complaints as to public nuisances in the town during the past year, or any other complaints in contravention of the Public Health Act.

GEO. MOORE,
Secretary.

BROCKVILLE.

MEDICAL HEALTH OFFICER'S REPORT.

Brockville has made noteworthy progress in all sanitary matters during the past year. As a consequence the death rate has been extremely light. In a population of something over 8,900, we have had a death rate of 109, or only about 12 in the 1,000.

Strict attention has been paid during the year to registering all cases of contagious disease. We have had of typhoid fever 23 cases and one death ; diphtheria 27 cases, 3 deaths ; scarlet fever 4 cases, no deaths.

Brockville, this year, has fallen into line with those cities and towns most progressive in sanitary matters in issuing licenses to dairymen, exacting in return an undertaking from them to carry out its provisions, and to immediately report any case of infectious disease occurring in their families.

During the month of August our town was honored by being selected as the meeting place for the "Association of Health Officers" and the Provincial Board of Health. Valuable papers were read, and ideas interchanged, which cannot but result in great good not only to those present, but also to the country at large. At this meeting the question of regular inspection and regulation of milk supplies was taken up, and the advisability of enforcing a uniform standard discussed. Thomas Macfarlane, F.R.C.S. Chief Dominion Analyst, giving a very instructive and practical exposition of the method adopted by him for its qualitative analysis.

Privy Pits..—Much good work has been done by the contractor during the summer, 593 permits having been granted during the past year. The great desirability of entirely abolishing privy pits has been strongly impressed upon our Board of Health, and very recently a form of agreement was entered into between the corporation and the contractors whereby the substitution of earth closets for the old privy pits will be very extensively effected, and the by-law forbidding, under penalty, the excavating of new pits be vigorously enforced. Low as has been our death rate during the past year, I am persuaded it can be still further reduced if this prolific source of disease is abolished. To the efficient carrying out of this scheme, it is absolutely necessary that a sanitary inspector be appointed who shall devote nearly his entire time to the supervision of this work.

Drains..—Much remains to be done before we can rest content with the sanitary condition of our town. There are many other drains useful only as surface drains, which are persistently used for the carrying away of house waste from sinks, etc., and in some cases even from water closets. This refers not only to streets on the outskirts but also to streets in the centre of the town, many of which are laid with proper sewers. Repeated notices to make connection with the sewers are disregarded. These surface drains are in many cases in bad repair and are choked up, resulting in the neighbouring soil being charged with sewage; when the drains are imperfect the purity of our water supply is endangered. One death from diphtheria can be directly traced to this nuisance of surface drains, the tile, where exposed, being found completely filled with the most offensive excrementitious matter. Another surface drain carries off sewage from a large cesspool on Market street used by the Bank of Montreal. Surely in the centre of our town and with proper sewage facilities this state of things should not be.

Wells..—As soon as our system of water works becomes the property of the town I would strongly urge the advisability of closing up all wells both public and private.

A number of cases of typhoid having developed in the neighbourhood of a well, on the corner of Wall and Brock streets, I have submitted a sample of the water to the Department at Ottawa for analysis. A report on its character will shortly be given.

Public Abattoir..—I would strongly recommend the establishment of a public abattoir within the limits of the town, thereby doing away with slaughter houses which are always a nuisance and frequently a cause of disease.

HARRY E. VAUX, M.D.,
Medical Health Officer.

CHATHAM.

MEDICAL HEALTH OFFICER'S REPORT.

I have the honor to submit the annual sanitary report of the town of Chatham for the year ending November 30th.

Contagious diseases have been reported during the year as follows, viz. :

| | | | |
|---------------------|-----------|-------------|----|
| Diphtheria | 45 cases. | Deaths..... | 5 |
| Scarlet fever | 5 " | " | .. |
| Typhoid fever | 47 " | " | 6 |

Seventeen cases of diphtheria occurred in April, the greatest in any one month of the year.

Twenty-seven cases of typhoid fever occurred in November, the greatest in any one month of the year.

The death-rate for the eleven months ending with this report was 18 in 1,000.

Measles and whooping-cough. Of these diseases a considerable number of cases were reported, but not nearly all the cases that occurred. A physician is only occasionally called to attend these cases, though he is very frequently called to treat diseases following after and consequent upon them, consequently all the cases are not reported. Some parents regard these diseases as trivial, and many have the too popular belief that children must contract them sometime. The people require more light on this subject. A large number of deaths are directly attributable to these diseases, as well as the too frequent loss of some one of the special senses.

Harmony and a desire to work together in sanitary matters has been shown by the town council, their committees and officers, and the Board of Health consequently a large amount of good sanitary work has been done, noticeably the improvements in the police court, the trapping of the uprights of drains, the abolition of open drains, and the filling up of depressions that gave lodgment to foul water.

The inspection of milk was regularly and thoroughly carried out in the early part of this year, and several milkmen were brought into court to answer to the charge of selling milk below standard. The cases were clearly proven, but prosecution failed because the by-law was found defective.

A subject for congratulation is the prospect of the completion of a good system of water works at an early date, the one thing most required by this municipality to make it one of the most healthful towns in Canada.

It is proposed to get the water from deep wells down to the rock. If water is found in sufficient quantities it will probably be of very good quality.

For several years great improvement has taken place in our methods of disposing of night soil. The old pits or holes in the ground have all been cleaned out and filled up, dry earth closets and water tight vaults taking their place. When the water works are completed, water closets will displace many of these.

The hog nuisance is still complained of. The by-law regulating the keeping of them is only operative between the months of May and October, but in our mild climate hogs are a nuisance if kept less than one hundred feet from any dwelling or street at any time during the year.

During the year by instructions of the Board a neatly printed and framed card containing the regulations of the "Health Act," concerning the duties of teachers, parents and others in cases of contagious or infectious diseases, was placed in each public and private school, college and collegiate institute in the town, thus educating all concerned in this important matter.

WM. R. HALL, M.D.,
Medical Health Officer.

COLLINGWOOD.

SECRETARY'S REPORT.

In presenting the sanitary report for the year ending the 17th of October, I have to state that the town has not suffered during the year from any serious epidemic, and has, on the whole, been rather more healthy than in previous years. The death rate has been rather less than last year. The deaths being $11\frac{1}{2}$ per thousand of the estimated population of 5,500, only three of which died from contagious diseases.

I reported last year that a system of water works was projected, and I am now pleased to state that the work of putting in a very complete water service is well under way, and pure water will be within the reach of everyone before the close of the present year.

In each case of diphtheria every precaution was taken to prevent its spread, the premises being thoroughly fumigated and the house placarded according to law.

JOHN HOGG,
Secretary.

DRESDEN.

CHAIRMAN'S REPORT.

I beg to report that during the present year there has been four cases only of contagious diseases reported to the secretary. One death from typhoid fever.

I may say that everything reported by the sanitary inspector requiring attention has been attended to, and the people of the town, with but few exceptions, are beginning to realize the necessity of keeping their premises clean.

Altogether I believe the town to be in a healthy condition.

I would recommend that measures be taken at as early a date as possible for doing away with privy vaults, in order to prevent the possible contamination of our water supply.

ASA RIBBLE,
Chairman.

DUNDAS.

MEDICAL HEALTH OFFICER'S REPORT.

Since submitting to you my report of a year ago there has been no outbreak of any infectious disease becoming epidemic. The number of cases of typhoid fever has been very small. One case proved fatal. Scarlet fever has appeared frequently, but only sporadically; isolation and disinfection having been carefully attended to. The cases have been quite mild, as a rule. One child, an infant, died from the disease.

In April a form of fever, evidently due to atmospheric influences, was very prevalent in the town. It developed very suddenly during the prevalence of cold east winds following some fine weather, and there were grounds for supposing that it was associated as an effect with our proximity to the marsh. Its appearance was much more limited on the north side of the town above Park street, and more general on the opposite side.

During the summer cases of dysentery were much more common than is usual in this town, showing itself rather in adults than in children. The cases of the ordinary diarrhoea of children were decidedly less numerous than the average of such cases for this place would lead us to expect.

I must again refer to the fact that the water supply of the town is still obtained from wells for the most part, and so long as this condition of things obtains we must regard our conditions of life, from a hygienic standpoint, as unsatisfactory. It is to be regretted that the town water is not more generally used for domestic purposes. Whether or not any number of the people of the town have a suspicion that the present supply of water might be easily exhausted, and are therefore unwilling to go to the expense of

putting in water services, I do not know, but there is no doubt that the risk of loss and the danger from disease is made much greater by drinking water from the wells in the town than it would be if the water from the reservoir were used.

In all other respects the sanitary condition of the town, in so far as it is controllable, may be considered good.

JAMES ROSS, M.D.,
Medical Health Officer.

GALT.

MEDICAL HEALTH OFFICER'S REPORT.

In making my annual report for the year now ending, I feel that all our citizens should rejoice at the good health that has prevailed during the year. Compared with other towns of similar size our death rate has been far below any of them that appear in the mortuary statistical report. I do not mean to say this is due to the energetic efforts of the Board, as we fortunately have been called to do very little, but rather due to the cleanliness of the inhabitants and the situation of the town, where nature has done so much by natural drainage, thereby carrying off many of the impurities and causes of diseases. During the year we have had a few cases of the various contagious diseases, but from the very low death rate, as the following table shews, is sufficient evidence of their mild character:—

| | | | |
|---------------------|----------|--------------|----|
| Typhoid fever | 5 cases. | Deaths | 1 |
| Scarlet " | 11 " | " | .. |
| Diphtheria | 2 " | " | .. |

You will thus see how few deaths, and might say few cases of contagious diseases, have occurred in the town. At this point it occurs to me to ask whether our Board should take any action in regard to the establishment of water works when we have such a good report to present. If we look at other towns on all sides of us with their sewerage systems and water works, and still not able to show as low a mortality as the town of Galt, we should consider well before making any change, being sure the supply of water will be better than at present. However I will leave that in your hands to make such report to the council as you may see fit.

G. P. SYLVESTER, M.D.,
Medical Health Officer.

GODERICH.

MEDICAL HEALTH OFFICER'S REPORT.

During the year the town has been remarkably free from epidemics. We have lately had ten cases of diphtheria confined to two families; one family having three cases, with one death; the other seven cases, with three deaths. The proper means were adopted to prevent the spread of the disease. In one of the cases I have no doubt the disease was caused by using water from a well that had neither been cleaned out, nor used for three years.

Our sanitary condition at present is very good.

ALEX. TAYLOR, M.D.,
Medical Health Officer.

HARRISTON.

MEDICAL HEALTH OFFICER'S REPORT.

For the earlier part of the year I have nothing special to report, good health prevailing generally in the town. About the 1st December diphtheria of a severe type made its appearance in one family; but by a judicious use of disinfectants and isolation of the family as much as possible and the carrying out of strict sanitary arrangement we have so far been able to prevent the spread of the disease. There have been no deaths and the third and last child is now about convalescent. It is difficult to account for the cause in this case, as all the surroundings are good. There have been a few cases of typho-malarial fever but no deaths have occurred. In a general way the sanitary condition of the town is fairly good; but I am of the opinion if more dry earth closets were in use and the inhabitants attended regularly and strictly to cleaning their wells, we would not be troubled very much with contagious and infectious diseases. No general system of vaccination has been adopted here for the last four years, consequently a great number of children attending the Public Schools are unprotected against an attack of smallpox. I would suggest to our school board that no pupil be admitted to the school without furnishing proof of successful vaccination.

S. M. HENRY, M.D.,
Medical Health Officer.

LINDSAY.

CHAIRMAN'S REPORT.

I beg to hand you herewith the annual report of the Medical Health Officer and Sanitary Inspector, and in doing so have to call your attention to the fact that from the beginning of the present year the duties of Medical Health Officer were performed by Dr. Poole, during the serious illness of our Medical Health Officer Dr. Coulter. Dr. Poole performed his duties so thoroughly that the work of the local board of health was made light, pleasant and agreeable. On resuming his duties the same remarks will apply to Dr. Coulter. This gentleman is now away for the restoration of his health, and his partner Dr. Clarke, performs the duties appertaining to the public health. Our inspector has also faithfully attended to his, at times, onerous and uninviting duties.

It is a source of pleasure to me to have to report that the public health of the town of Lindsay during 1889 has been unprecedentedly good. Only three cases of scarlatina of a mild type have been reported by the resident practitioners, all in one house and in one family, and only one placard put up.

The number of deaths from all causes during the year is 53, thereby exhibiting a rate of 9 on the thousand or of 9-10 of one per cent. on the entire population.

I have strongly to recommend that the council grant the sum of \$9 for the purpose of obtaining from the Government analyst at Ottawa a set of apparatus for testing the milk supply of the town—the mode of test is simple and will be of great benefit to the public.

I have again to call the attention of the council to the unsanitary state of the drain on Lindsay street, which has been for some time turned into a common sewer—owing to the unusually large rainfall during the summer. This drain has not produced any very serious illness; but during the fall the odors arising from it have been a source of annoyance and complaint from the residents in its vicinity, and those who have to travel over it. As the improvement of the sewer and abatement of the nuisance is under the consideration of the council, I don't deem it expedient to further refer to the existing evil.

The dumping ground sometime since purchased for the reception of offensive deposits has been closed up owing to the fact that the land is unsuited for the purpose for which it was intended.

As the matters which principally occupied the attention of the Local Board during the year are referred to by the inspector very fully, and as the local committees of the board have been very careful in investigating complaints, and promptly seeing to the abatement of nuisances, my duties have been very light and of a trifling nature.

J. DEACON,
Chairman.

MILTON.

CHAIRMAN'S REPORT.

The Board held five meetings during the year and are pleased to report that their labors were comparatively light, few formal complaints being made upon which they were called to adjudicate, as the timely removal of anything likely to prove injurious was attended to in the early part of the year.

The Board has given notice to the proprietors of the two slaughter houses within the town (mentioned in last year's report) and also of a cow byre to have the same removed by the first day of May next.

In the matter of the drainage of refuse liquor from the tannery into the creek running through the town, the Board has requested the proprietor of said tannery to take such steps as will prevent the same.

The Board having no medical health officer cannot present any statement which they would consider complete in respect of the number of cases of disease considered to be contagious, but have compiled the following from the returns of deaths made to the clerk of the municipality, and from interviewing resident medical practitioners: Typhoid fever and typho-malaria, twelve cases, two only of those proving fatal by complication with other diseases setting in. Scarlet fever and scarlatina four cases, none fatal. And we are pleased to report that there were no case of either diphtheria, measles or whooping-cough in the town known to the physicians or to the Board.

SAMUEL DIAL,
Chairman.

MEAFORD.

MEDICAL HEALTH OFFICER'S REPORT.

During the early part of the year the public health in this municipality was good. During the latter part of the year, however, and especially during the heated term of the latter part of July, the month of August, and the early part of September diarrhea tending to be dysenteric in form was prevalent, especially among children.

Three cases of diphtheria were reported during the year, they existed at the same time one in the same house. The disease did not spread any further. One case of scarlet fever was reported; but the patient being properly isolated, a notice placed on the house, and proper means of disinfection used no extension of the disease took place.

A number of cases of continued fever of the remitting type have occurred during the latter part of the summer. No deaths from this cause were reported.

In regard to the cases of diphtheria and the case of scarlet fever there is reason to believe that the cause was brought from elsewhere and was not local.

In regard to the case of fever and diarrhoea the Board held a different view and was disposed to attribute a causative agency to the pit closets which exist in considerable numbers in the town. Believing such causes to be sources of contamination of the water supply the Board caused notices to be printed and distributed to the property owners, or their agents, on whose property such objectionable closets existed to have the same cleaned out, disinfected and the pits filled up with earth, and water-tight boxes substituted for the pits. The aforesaid boxes being designed to receive the excreta and also to serve as a receptacle for the ashes resulting from the consumption of wood or coal in the stoves. The ashes serve to absorb the liquid portion of the excrement and act as a deodorizer.

Directions regarding the mode of construction of these box closets were furnished to the parties concerned by the sanitary inspector who distributed the notices. In case of neglect or refusal on the part of any to attend to their closets according to the notices and directions of the inspector, the Board intends to order (through their sanitary inspector) the improvements to be made and the expenses of the same to be charged to the persons, on whose premises the nuisances exist, as the law directs.

Reports in the matter of drains, ditches, stagnant water, marshes, etc., have been received and dealt with by the Board from time to time.

An analysis of the water from certain wells in the town furnished evidence which justified the Board in taking action in the matter of the pit closets.

C. F. SNELGROVE, M.D.,
Medical Health Officer.

NIAGARA FALLS, TOWN.

SECRETARY'S REPORT.

The town has been free from epidemic diseases and the public health good.

The town has now the benefit of several sewers which were put in, in 1888 and 1889.

J. ROBINSON,
Secretary.

NAPANEE.

SECRETARY'S REPORT.

At the first meeting of the Board after its appointment, it was arranged that monthly meetings would be held, and suggested that greater vigilance be observed in enforcing the provisions and authority of the Act. The Board met several times during the year, as often as the necessities of the sanitary condition of the municipality demanded its attention and consideration. In a few instances only were complaints lodged respecting the existence of places in a dangerous sanitary condition, which were promptly attended to, and the cause of the nuisance immediately removed and abated.

At a meeting in the month of April, the usual notices were ordered to be printed and distributed throughout the municipality, requiring all yards, streets, lanes, stables, etc., to be thoroughly cleaned and disinfected and put in a proper sanitary condition, and

the removal of all filth and other matter dangerous to the public health, on or before the tenth day of May, which intimations were well observed and carried out under the directions and vigilance of an efficient sanitary inspector. The Board has cause for gratitude because of the absence of epidemics during the year and for the generally healthy state of the municipality.

Two cases each of diphtheria and scarlet fever were reported, all of which were returned as convalescent.

The record, however, shows the usual average yearly death rate.

PHILIP EMBURY.

Secretary.

OAKVILLE.

SECRETARY'S REPORT.

During the past year the general health of the inhabitants has been very good, very little sickness having prevailed, none of an infectious or contagious character.

The best efforts of this Board have been exacted through their efficient inspector, to prevent the accumulation of garbage of any description upon private property in the town, and also upon the highway and public places, and where any such accumulation has taken place it has been promptly removed.

There has been some additions made to our system of sewerage, but the Board regrets to say, that it is still very far from perfect, but it is hoped that by gradually adding to the same, it will, at no very distant day, be all that will be necessary.

An agitation is now on hand for a construction of a system of water works in the town, and this Board expresses the hope that such works may be constructed, as they feel assured that they would remove the cause of much of the sickness which occurs, by providing water from lake Ontario and avoiding the use of water from wells which, undoubtedly, is more or less contaminated by sewage and other obnoxious percolation.

R. BALMER,

Secretary.

OWEN SOUND.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting the annual report for the year 1889, I have pleasure in reporting much improvement in the general sanitary condition of this locality—true, much remains yet to be done. Many nuisances of a disagreeable kind have been arranged without much difficulty, and the two which have demanded the greatest amount of attention, are lot one on Bay street, which has at last been remedied by connection with the Bay street sewer, and that portion of Baker street between Murdoch and Boyd street which has also been remedied by filling up the overflowed lots and connecting the buildings with the Baker street sewer. Another serious nuisance which is still unremedied, exists where the Division street sewer empties north of the swing bridge. In May last this matter was reported to the town council, recommending that the mouth of the sewer be continued to deep water, thereby covering a very offensive spot.

I trust that at no distant date this change will be made, as it will produce a very pleasing change upon the olfactory nerves as well as on the organs of vision of those passing so public a place.

During the year permits have been granted for the construction of sewers on the following streets, viz:—Bay, Peel, Boyd and Scope streets. An application for a sewer on Poulette street, between Campbell and Dease streets could not be acceded to, as the pipe would convey the sewage to the still water of the dam, the same sewer might be rendered available by reversing the direction of the flow from Dease to Campbell street and thence into the river.

It is to be hoped that something may be done with the drainage of some parts of the town on the west side of the river, more particularly Mulholland, Terrace and Beech streets, which are being rapidly built up with no alternative but draining into the ditches. The land is low and the subsoil wet. Many of the cellars have standing water all year.

The system of sewerage adopted here has in the meantime proved very beneficial. Typhoid fever, which at one time threatened to be a regular and serious visitor, has now almost disappeared. During the summer occasional tests were made of the milk offered for sale. It is gratifying to know that all samples examined reached a very fair average.

I would again call your attention to the constant source of danger which continually menaces the population in the privy vault. This antiquated system should be done away with and in its stead the drawer or pail system, with dry earth adopted. The first change would cost little and the yearly cost, if the system were it generally adopted, would be a trifle compared with the present expense.

During the summer there existed two or three sporadic cases of diphtheria. Complete isolation and disinfection preventing any further spread. In October the disease assumed an epidemic form, making its appearance simultaneously on Mulholland, Bury, Melville, Hill and another street, name unknown. Attention was first called to the serious nature of the malady from the death of a child in the house on Mulholland street on the 21st of October, and the report that the most of the family were prostrate with the disease in a very serious and dangerous form.

On the same day I received peremptory instructions to enquire into the nature and correctness of the report, and if it were correct to use every endeavour to arrest the progress of the disease. In the house I found one dead, one dying and four in bed with the disease. Strict measures were at once taken to isolate the house, visiting was also stopped, and placards as soon as possible were placed upon all the infected houses, five in all. At present writing four of these placards have been removed through recovery of the patients, two by authority of the Board of Health and two without any authority.

In one instance the family have not entirely recovered.

It is a matter of congratulation that so far the epidemic appears to be arrested, as there are no new cases to report outside of those houses already reported.

ALLAN CAMERON, M.D.,
Medical Health Officer.

PETERBORO'

MEDICAL HEALTH OFFICER'S REPORT.

The present year has been notable for the almost perfect freedom of the town from infectious disease, a single death only, and that from diphtheria which originated elsewhere, being the total mortality from this cause. A very few mild cases of typhoid and scarlet fever have been reported, but none have been fatal, something unusual in a town as large as this, throughout a whole year. In no case has any disease spread, the attack being limited to the house in which it broke out, and, as a rule, to one member of the family. Even the deaths among children during the summer months from diarrhoeal affections were hardly worth mentioning. The proportion of ordinary or non-infectious illness has also been extremely low. Last year I showed how the death rate had decreased

in four years from 18½ to 16 per thousand, and expressed the hope that it might remain at that. This year the record is broken more than ever before. Last year with a population of 8,989 there were 157 deaths. This year with a population of 9,302 there were only 118 deaths. In other words the death rate has been reduced to a shade above 12½ per thousand. This is a remarkable showing and merits the attention of manufacturers and others desiring good locations. Such an uncommonly low death rate, however, is exceptional, and a few words may be said about it. There is a general impression that a certain amount of disease must occur whether times be good or bad, but any medical man knows that the proportion is less, other things being equal, in periods of financial depression. It is not that people consult a physician less readily, but the sum total of illness is actually less. Greater abstemiousness in living, the avoidance of excesses in eating and drinking are part of the cause. Rich food and frequent late suppers induce a plethora of the system which predisposes to disease. Then in busy times the wear and tear of money making, the rush and hurry of life, reduce nervous strength, bring on fatigue, and thus render the constitution less capable of resisting attack. Thus dull times, through a financial misfortune, are often a physical blessing. A bow string must sometimes be relaxed in order to preserve its tone, and the human system follows the same law. Still sanitary work must have had a great share in producing this result. Tons and tons of garbage and refuse that were formerly allowed to remain festering and polluting both air and water, are now carted away every year. Isolation and disinfection have done their work. Besides, there is a vast and unmeasured benefit in the value of sanitary precautions being brought before each individual, and the constantly growing feeling that these matters of the highest importance, and in the care which is the practical outcome of this feeling.

The following are some of the points on which your officers' attention has been engaged during the year :—

Slaughter Houses.—When the first Board of Health was inaugurated it was determined that all the slaughter houses should be removed outside the municipality at the earliest possible moment, and that no others be allowed to begin operations. The number has gradually been reduced to three, which have been allowed to continue so long as they were kept in good sanitary condition. Recently another has started without obtaining permission of the Board, but at the request of the town council proceedings have been stayed until March 1st, when, if not removed, action will be taken. No further permits are to be granted. Inspections of the slaughter houses have been frequently made during the summer ; although the wet season has made it more difficult to keep things in order, a fair condition has been maintained.

Removal of Garbage, etc.—This has been carried out more systematically and to a greater extent than ever before. Complaints are sometimes made regarding the unpleasant odor noticed here and there on sultry summer evenings, and it assumed that very little cleaning up is done in the vicinity. This is often a mistake, as it arises from the adjacent ground which has been saturated for years. The contents of a vault may be removed and yet the surrounding soil give off disagreeable emanations. The remedy is disinfection, frequent and thorough. A few pounds of green vitrol or chloride of lime will work wonders. I called the attention of the public to the necessity for this particularly in August and September, which are the breeding months of autumnal fever. I will do so again, as nothing is more important.

Earth Closets.—Whenever it has been thought advisable, earth-closets have been recommended as substitutes for privy-vaults. But in all cases it is not advisable. Abominations as vaults certainly are, earth-closets become much greater abominations if not properly attended to, as has been disclosed more than once lately. When tenants are coming and going, and where removal of excreta means expense, earth-closets can be kept in good condition only by means of a scavenger employed by the town. Such an official, whose services could be obtained at any time, without direct cost, would do more to ensure cleanliness than any other arrangement that could be devised.

Sewerage.—The question of sewerage is always important, but in view of the increased good health of the town and the investigations that are being made in various

places as to the best mode of treating sewerage, the town council are wisely exercising caution. Electricity is being brought into use for this purpose, and there is also a war between different systems of chemicals, hence it is better to wait patiently and see which wins, than to plunge into a large expenditure without definite and accurate information. Last summer I saw the separate system in operation at Brockville, and everyone seemed pleased with it, but the difference between the Otonabee and the St. Lawrence might necessitate some modification here.

Pollution of Streams.—As it has been rumored that there is contamination by manufacturers and others of the river above the source of water supply, your officers intend to examine carefully both banks of the river between that and Lakesfield, and, if necessary, inform the Provincial Board. Now that the season is so far advanced this will be impracticable before spring, but the earliest opportunity will be taken, and the results communicated to you. Regarding the creek which passes through the town, I am glad to say that some of the larger manufacturers are discontinuing the pollution of it from closets, and we expect to get householders and others to follow.

Inspections.—House to house inspections have been made by the sanitary inspectors in the intervals of their other duties. In this way a large part of the town has been gone over, larger than in any previous year, the central portions of course receiving the lion's share. In spite of the wet weather, yards and premises have been better kept this year than usual.

Complaints.—A large number of complaints have been sent in throughout the year, but in most cases the grievances have been rectified by a simple notice to the offenders. In a few cases proceedings were necessary, which, it is to be hoped, will have a salutary effect in the future.

Well Water.—I have analysed nearly a hundred specimens sent in during the present year, and found them of all degrees of impurity. The most frequent cause is a neglect to clean the well in spring. Some persons have told me that their wells had not been cleaned for ten or fifteen years. It should be remembered that the by-law requires all wells that are in use in the municipality to be cleaned out before the 1st day of July in each year.

Milk Supply.—No complaints have been made as to impure milk being sold, and hence it may be assumed that our supply is above the average in quality.

Infectious Diseases.—These have been pretty faithfully reported by medical men, there having been throughout the year five cases of diphtheria, seven of scarlet fever and three of typhoid. I have informed the librarian of the Mechanics' Institute so that books might not be distributed to affected families, but it will be better to have some blanks printed for that purpose.

There is an important point to be attended to in connection with this. Should scarlet fever occur in a family who have at the time books from the institute in the house, these may be sent back swarming with germs, and spread the disease far and near. Some means will therefore have to be found of disinfecting the books in such cases.

J. CLARKE, M.D.,
Medical Health Officer.

PERTH.

MEDICAL HEALTH OFFICER'S REPORT.

Typhoid fever has prevailed to a considerable extent during the fall, a few cases have been very severe and of a very low type, but the mortality has been very small compared with the visitation of last year. Disinfection and better sanitary regulations

generally, have been attended to, which may, in part, account for the mildness of type. One of the fruitful sources of this as well as other preventable diseases, is the custom of throwing slops in the backyard, polluting the soil, and when the proper atmospheric condition presents itself, innumerable bacteria are liberated, to be inhaled by the unfortunate victims of their own carelessness.

Two things ought to be done to prevent this: (1) provide drainage for the liquid refuse, and (2) and some suitable system for collecting and cremating the solid portions. Until this is done kitchen garbage will occupy a front place in the ranks of the varied elements that go to make up disease.

The necessity for a wholesome supply of water for domestic purposes still exists, and the solution of the vexed problem seems to be as far off as ever. This once secured, together with a trunk sewer by means of which a comprehensive system of drainage could be brought about, our town would occupy a prominent place in a sanitary point of view.

Before concluding this report I would like to draw the attention of our Board to the necessity of urging upon the different refiners the necessity of introducing such measures as will result in the burning of the gas that is now escaping into the atmosphere, and constituting a nuisance of the first water. It is detrimental to health, unpleasant to the sense of smell, and detracts from the attractiveness of the town. It can be easily remedied, and I trust our Board will agitate the matter until the desired end is accomplished.

G. D. LOUGHEED, M.D.,
Medical Health Officer.

PICTON.

MEDICAL HEALTH OFFICER'S REPORT.

This report will show that the present year has been an exceptional one, in its freedom from sickness, and the absence of any epidemic calculated to alarm our people. Four cases of diphtheria of mild type have been reported to me, all of which recovered. Typhoid fever has been somewhat prevalent, but this also has been of a remarkably mild type. One death only has been brought to my notice. Malaria has been very active, probably from the low state of the waters in the bay and marsh, but has in all cases succumbed to an antiperiodic and antiseptic treatment.

The Health Officer has the pleasure to report the good feeling that exists between the officer and the inhabitants, in no case has it been necessary to appeal to the law to aid us in enforcing sanitary reform—the people recognize that it is for their good, and act in unison with the officers to promote sanitation—what a difference to what they submitted years gone by.

It is impossible to estimate the good effect of pure milk as a diet for infants and invalids, but on the other hand death is often in the pot of this elegant and nutritious liquid. Nothing absorbs noxious and poisonous elements so quickly as milk—it may produce scarlet fever, diphtheria and typhoid fever in alarming proportions, just as in an opposite ratio, it feeds and nourishes the new born infant, and the octogenarian tottering to the grave. How are we to know the difference? asks the alarmed public. Science, investigation and prevention must come to your aid, to defend yourself and children from these unsuspected dangers. The sickness and deaths in an entire hamlet, and in city houses supplied with a certain milk have been traced to our unclean stables, to impure water, and to diseased cows. The easiest way of adulterating milk is by the addition of water, the water may be impure and convey its impurities to the milk in an alarming degree. I would suggest to our council to impose a license of 25 cents a year.

and so place the vendors of milk under the regulations of the council and board of trade, and give the health officer the right to enter all cow byres, and test the quality of the milk at his option. I would suggest also that the health officer be empowered to analyze all food and drinks offered for sale, in conjunction with his other duties. The wonderful discoveries which have lately been made in pathology, show that most diseases have a distinct origin from some of the many forms of bacteria that infest our persons and dwellings, and show that cleanliness and attention to our sanitary surroundings will ward off many diseases, which would otherwise prove fatal. As we are now to have an efficient system of water-works I would suggest that a hydrant should be placed at the west end of the drain that runs through the town so that it could be flushed frequently during the heated term.

HENRY B. EVANS, M.D.,
Medical Health Officer.

PORT HOPE.

MEDICAL HEALTH OFFICER'S REPORT.

I beg to present you with a report of the health and sanitary condition of our town for the year 1889. In regard to the general health, we have been unusually free from the diseases incident to the summer; such as cholera infantum, etc., and we have every reason to congratulate ourselves upon the state of our good health.

In regard to infectious and contagious diseases, we had but two cases, both diphtheria, one an imported case from Mill Brook, it is said, was fatal. The other was of a very mild type. The result proves that all requirements of prudence and good judgment in isolation, disinfection, etc., were carried out. Seeing that they were not followed by any more cases.

D. B. POWERS, M.D.,
Medical Health Officer.

PORT ARTHUR.

MEDICAL HEALTH OFFICER'S REPORT.

The year 1889 has been one of epidemics, early in January chicken-pox made its appearance, and before it had been stamped out whooping cough was reported, and cases occurred in almost every house in town where there were young children. By the time the last "whoop" had been heard measles came to stay, and became, if possible, more general than the whooping cough had been. So many children were ill with measles that the public schools had to be closed three weeks in October. In both latter named diseases it did not appear to be known that it was the duty of householders to report infectious diseases, when it was not deemed necessary to call in a doctor, and that moreover it was their business (the physicians') to do so at any rate. The closing of the schools showed the necessity of so reporting; and should another epidemic occur we shall doubtless manage things better than was done regarding any of this year's epidemics. From cases reported, and those discovered which had not been reported, there must have been about 300 cases of whooping cough and at least 350 cases of measles.

We had some cases of diphtheria and scarlet fever during the year, but these diseases never became epidemic. We had merely a stray case occasionally, and I cannot recall an instance where we did not then, or afterwards locate, the cause, when, of course, the evil was rectified. With the experience of the past three years before me, I do not see why we should ever necessarily have a case of diphtheria.

Several cases of typhoid fever were treated in the hospital, but none of the parties belonged to the town or contracted the disease here. Several persons in one house had typhoid fever, but no other cases have been known or reported.

It is satisfactory to be able to state that none of those diseases has been deadly in their effects. Four children have died this year from measles or its sequel, two from scarlet fever, and only one from whooping cough. There were no fatalities from diphtheria. There was a considerable amount of summer complaint among infants; but only two deaths were reported. This may be accepted as correct, for the authorities are very strict in seeing that the registration of deaths is properly observed by the public.

The death rate has been unusually large; more than double that of last year. It is hard to say just how this is, because, as before stated, none of the epidemics have been deadly in their effects.

Chronic heart disease, however, has claimed an unusual number of victims, two of whom were young women; the number of deaths from this cause amounts to about nine per cent. of the whole mortality.

A very large number of complaints have been reported and looked into during the past year; and though, perhaps, all has not been done by the Board of Health that some people expect of it, a large amount of really good work has been done and several chronic nuisances have been abolished. With more hearty co-operation and moral support from the towns people generally, the Board of Health for 1890 should have no difficulty in placing the town in first-class sanitary condition; and in removing the remaining blots on its character for cleanliness. In this connection it may be stated that as many sanitary improvements may be impeded by the operations of the Frontage Act, under which the town groans, some additional power should be given Boards of Health to enable them to carry out necessary improvements, such as the construction of drains and sewers, when the cupidity of owners of property fronting on the streets requiring such improvements renders futile the efforts of the Board to improve the sanitary condition of the town.

THOS. S. T. SMELLIE, M.D.,
Medical Health Officer.

SIMCOE.

SECRETARY'S REPORT.

The Board of Health have the honour to report that early in the spring they took the necessary steps to have notices given to the residents of the town by the health inspector, to clean up their premises and remove these from all accumulation of animal or vegetable matter that might prove injurious to the public health, and the health inspector reported a ready compliance with the requirements of the Board.

The Board further reports that the general health of the town during the current year has been highly satisfactory, there being no prevailing epidemic or any contagious diseases, except the one case of diphtheria mentioned in the report of the Medical Health Officer, which case the Board took prompt measures to isolate, and, at a trifling cost, prevent danger from further spreading.

On complaints from residents living near the canning factory the Board directed their attention to the removal of the offensive smell arising therefrom, and, on examination, they directed Mr. Innis, the manager, to abate the nuisance, which he promptly did, and no further complaints were made.

N. C. FORD,
Secretary.

STRATHROY.

MEDICAL HEALTH OFFICER'S REPORT.

In accordance with my duty as Medical Health Officer, I beg leave to lay before you as concisely, at the same time as correctly as possible, a statement of my observations during the past year. I have to congratulate the town council in the selection of a very efficient Board of Health, who have done very much useful work for the benefit of the public health. At the same time I would urge the necessity of further extending the usefulness of the Board to a careful and systematic study of sanitary science, school hygiene, and all matters pertaining to the benefit of the public health, and to a rigid enforcement of the Health Act, which, if thoroughly carried out, will render invaluable service to the health of the community at large. There are still many places in our midst that are low and improperly drained, one cesspool opposite the Albion hotel in particular needs remedying in some way, as at times it gives off a very offensive odor. I must admit, however, that in all cases where it was possible, under ordinary circumstances to improve the condition of affairs, the authority of this Board has been duly recognized, and the order of the sanitary inspector in most cases observed. With regard to the disposal of excreta, garbage and other unhealthy material, I must say that the requirements of the Act have, through the vigilance and energy of the sanitary inspector, been most satisfactorily carried out. The effects of their non-removal completely before they can decompose is pretty generally known, still it might not be amiss to state a few of them in order that the requirements of the Act may be more readily complied with. During decomposition they evolve quantities of noxious gases, low organisms are given off and amongst them the germs of disease. Most of what are termed zymotic diseases, such as diphtheria, typhoid fever, etc., are propagated in this way. The soil also, particularly in the vicinity of water closets and other outhouses, becomes saturated and gives off in consequence germs laden with impurities. The filth carried into wells from the surface and through the soil is the cause of a large amount of typhoid fever, diphtheria and other diseases that occur in our midst. Two of the worst cases of typhoid fever that I have had this year were due entirely to that cause, so that it is clear to observe that the timely removal of all such poisonous material to a place whereby their subsequent presence they can do no harm, is of the utmost importance.

We have had quite a number of cases of typho-malarial fever in this place during the year, the majority of them breaking up in from 10 to 14 days. Of the pure typhoid type, so far as I can learn, there have been about 20 to 25 cases, and only four deaths, and the latter were more or less complicated with other diseases, had not very good nursing, and in some cases the dieting was very imperfect. There were very few cases of scarlet fever or diphtheria, and only one case reported fatal. I would still urge, as in a previous report, the advisability of securing a building that could be used as an hospital where those affected with contagious diseases, and not having proper conveniences for care and attendance, could be removed, and by having a competent nurse, many lives might be saved, and the head of the family could then follow his usual employment. The sanitary inspector made a house to house inspection during the season, and reports the number of closets cleaned and deodorized as 609, about the same number of yards cleaned of refuse, one well filled up and others cleaned out. All the slaughter houses were in good condition. Several of the cesspools were disinfected, and that he has since made a monthly inspection of the yards and reports all now in a fairly satisfactory sanitary condition.

G. HENDERSON, M.D.,
Medical Health Officer.

SEAFORTH.

SECRETARY'S REPORT.

The general state of the health of the town has been good. In two instances we have got nuisances removed which have been of some years standing. Public opinion is gradually, though slowly, awaking up to the connection there exists between cleanliness of surroundings and health. Some parties have offered pretty strong objections to having their houses placarded in cases of infectious diseases.

WM. ELLIOTT,
Secretary.

ST. MARY'S.

MEDICAL HEALTH OFFICER'S REPORT.

I beg leave to state that during the year ending 15th November, there were reported to the secretary three cases of typhoid fever and seven cases of scarlet fever, all of which recovered. There were also reported five cases of diphtheria, four of which recovered, and one death.

The town during the past year has been very healthy, as there have been but nineteen deaths in it up to the date of our report. As our population is about 3,700, that makes our mortality very low, and the town might very justly be classified as one of the healthiest in the whole province.

A town having such excellent water emanating from so many flowing wells and never-failing springs, and having such good natural drainage will of necessity be a healthy one, unless its inhabitants do something to interfere with the course of nature.

I am pleased to be able to state that the trustees of the public schools, during the past summer, discharged their duties fully so far as putting the different rooms of the schools in a good sanitary condition. The floors, wood work, walls, ceilings were all thoroughly cleaned and disinfected. All the outhouses were also cleaned out and thoroughly disinfected. So long as the privy pit is used this ought to be done every year, for the expense and trouble in connection with it are mere ciphers in comparison with the benefits and advantages the children derive from all the surroundings of the school being in a state of perfect cleanliness.

The inspector made his usual rounds last spring and doubtless did good work.

Our people are gradually becoming more and more alive to the importance of having a general cleaning up, once a year at least; but in country schools as in some others the progress of some persons is remarkably slow.

I regret to observe that the sewer nuisance has still an existence, and that a number of our citizens complained of it during the past summer. As I entered into that subject very fully in my report of 1887, it is wholly unnecessary to state much more about it now—the views I expressed then are my views at the present time, and the importance of attending to it is unquestionable.

A new industry has been begun in the west ward, on Thomas street, which doubtless will require the attention of the Board during the coming summer if not before that time. It is the opening up of a quarry where the excavation for stone is lower than the bed of the river Thames, the consequence is that stagnant water has been there during a portion of last summer, and parties living in the vicinity of it have complained of the disagreeable odor arising from it. It is proper to remark here that one of the three cases reported of typhoid fever was close to this quarry, the other two were very near the mouth of the sewer, not more than a few rods from it.

In this connection I may state that in a former report I directed the attention of the board to a similar excavation on the south side of the "Old Lock-up" school in the south ward; but up to the present time nothing has been done in the way of putting it in a good sanitary condition.

JOHN SINCLAIR, M.D.,
Medical Health Officer.

TRENTON.

MEDICAL HEALTH OFFICER'S REPORT.

The early part of the year was signalised by a severe outbreak of diphtheria, which by strict quarantine was happily confined to three families. These with about an equal number from the neighboring township of Murray, equally well guarded by its Local Board of Health, ended the attack. The first case was peculiar in its advent. A domestic servant in a town twenty miles distant had contracted diphtheria, and the children of the household to avoid the contagion were sent to visit here till it was thought safe for them to return. Some days after the visitors had left the host's child, and subsequently the whole family, were stricken with diphtheria, with a fatal result to all except the mother and youngest child. This shows how much care should be exercised to prevent the spread of this and similarly infectious diseases.

In other respects the health of the town has been good, though this can scarcely be said to be due to a united effort to promote sanitary measures. We are, with the exception of a few drains, absolutely without sewers, and with little water for domestic use except that from more or less suspicious wells. This question of sewerage and water supply was alluded to in my last report, when the hope was expressed that some steps would be taken to enquire into the systems most suitable for our needs. Nothing, however, has been attempted in this direction.

The application of a few citizens to the municipal council to relieve their cellars from stagnant water which renders their dwellings dangerous to health, may serve to awaken interest in this matter, and lead to the adoption of a comprehensive scheme for securing a system of sewerage, water and light, in connection with our newly created water power, enough of which should be retained for the municipality's own requirements. I trust our Board of Health may press the case on the attention of the council.

The sanitary inspector has been actively engaged since May 1st in house to house inspection, and, as usual, found yards, stables and styces in many parts of the town in a filthy condition. Forty or fifty of these were reported and dealt with. The water from suspected wells was brought for analysis, and a number condemned as unfit for use. The inspector fears that the contents of closets are not properly removed when cleaned, as the deposits at the nuisance ground is too meagre. It is feared that much of the night-soil is buried on the premises to be got out of sight. The matter will be more closely watched in future. The bread, meat and market produce offered for sale have been faithfully inspected, and little cause of complaint exists in regard to these articles. In last report I advised the purchase of a horse for scavenging. The inspector returns to the subject this year, and complains of the state of the rear of stores and streets from the presence of sweepings and loose paper, which not only disfigure the premises, but on windy days frighten horses and render the danger from fires greater than if confined in boxes and removed twice a week. The horse could be used for this purpose, and when idle could be probably employed by the street committee. Nothing has been done towards the purchase or erection of an isolation hospital, though this has been part of the burden of my report for the past two years. In time of peace prepare for war. It will be both expensive and inconvenient to provide a suitable place on the spur of necessity.

The veterinary surgeon of the Board has furnished an exhaustive report on the health, housing, feeding, etc., of the cattle in all the dairies supplying milk to the town. Nineteen dairies are reported. The points of objection are that in a few cases the well is too near the byre and the drainage imperfect, while the milk is kept in cellars, vacant rooms, etc. A separate milkhouse, with proper means for storing and cooling the milk, will be insisted on. The milk itself was better up to the standard than last year.

The mortality is this year higher than last, though the ratio of births to deaths is also higher. As a sign of prosperity the marriages are also greater in number.

CHARLES McLELLAN, M.D.,
Medical Health Officer.

WEST TORONTO JUNCTION.

MEDICAL HEALTH OFFICER'S REPORT.

In compliance with the requirements of the Public Health Act I beg leave to submit the following report of the sanitary condition of the town of West Toronto Junction :—

During the past year there have been quite a number of cases of infectious diseases within the limits of the town. A low form of typhoid fever having been quite prevalent during the autumn months, very few of the cases resulting fatally.

There has been also a number of cases of diphtheria, as well as of scarlet fever, at various intervals during the course of the year; none of these diseases however became epidemic.

The cause of a great deal of illness about the town can, I think, be ascribed to the lack of a proper system of sewerage. The necessity for this is gradually forcing itself upon the public mind, and I am glad to know that this matter, which is of vital importance in regard to the future welfare of our town from a sanitary point of view, is about to be dealt with.

An excellent system of water supply has been introduced during the course of the year, and although the town water is being largely used, I would recommend the compulsory closing of all polluted wells in the line of streets wherever water pipes are laid.

Respecting night soil and garbage I may say that a contract was entered into for the removal of night soil for the year, monthly visits being made by the scavenger. On the whole this has been satisfactory. This contract, however, did not include the removal of garbage, and I would deem it wise that if a similar arrangement is made for next year that this matter be provided for, or better still, the organization of a scavenging department by the town.

The sanitary inspector, I may say, has been very attentive in the performance of his, not always pleasant, duties, and has rendered me every assistance in his power.

G. W. CLENDENAN, M.D.,
Medical Health Officer.

WEST TORONTO JUNCTION.

SECRETARY'S REPORT.

The Board has met monthly, and several adjourned meetings were found necessary. All closets have been cleaned monthly, excepting those lately constructed. Scavenger work has been attended to in lanes wherever it was necessary. All slaughter-houses and pig-pens have been removed outside the municipality. Cow-byres and dairymen's premises have been worked under permit and are visited by our inspector.

I am pleased to report that the C. P. R. Company, in compliance with our wishes, built a filtering tank to abate a nuisance arising from sewage matter at their station. The towns people also heartily co-operated with us and the inspector to promote cleanliness and good health. Already we have a good water supply, and as soon as the best method of disposing of our sewage be ascertained the work will be pushed forward to completion. Our medical health officer will report to you more particularly in regard to the health of the town. I may say that although measles and whooping cough has visited us, yet it did not become epidemic. We had a few cases of diphtheria and typhoid fever. Everything considered, the health of the people and the sanitary state of the place is exceptionally good.

JAMES RITCHIE,
Secretary.

WALKERTON.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting my annual report for the year ending 15th November, 1889, I have the satisfaction to state that our town has during the past year been remarkably free from epidemics and preventible diseases of all kinds.

During the year ten cases of a very mild type of typhoid fever have been brought to my notice. One case proved fatal; the immediate cause of death undoubtedly being the exertion of travelling home to Walkerton during the height of the fever.

There have been in all five cases of measles, all in one family and all recovered. By strict isolation this very contagious disease was limited to the one family.

One case of diphtheria occurred. This case was kept isolated from members of the family and others, excepting necessary attendants, and after recovery all infected bed clothes, bedding, etc., were destroyed, and the place thoroughly fumigated, thus putting an effectual end to this dread disease.

I believe the origin of the few cases of typhoid fever was traceable in most, if not all, of the cases to impure drinking water, hence I would urge upon the Local Board of Health and through them upon the town council the necessity of providing a plentiful supply of pure drinking water. Wells or springs in a town like Walkerton cannot be depended upon to provide pure water.

Another matter which requires the attention of the health authorities and that of the town council is the disposal of excreta. In the absence of a proper system of drainage and public water supply, I would recommend that the town council pass a by-law compelling owners of houses to provide suitable structures for the use of the dry earth system. This should be brought into effect by the first of June of next year.

The drainage of some wet or swampy land in the town would also add to the safety of the public health. One place in particular, at the east end of Cayley street, near the stables of R. Truax, etc., should receive attention.

The practice by some of our citizens of depositing refuse of various kinds about the public park at the bend of the river should be discontinued, as it is not only unsightly but repulsive and dangerous to health.

I would further recommend that the inspector next year be instructed to make in spring or early summer a thorough inspection of all premises, including yards, store-houses, stables, cellars, etc., and see to it that they are all thoroughly cleaned and put into a proper sanitary condition.

M. STALKER, M.D.,
Medical Health Officer.

WINDSOR.

MEDICAL HEALTH OFFICER'S REPORT.

This has indeed been a year of grace for Windsor so far as contagious disease is concerned. All told there have been eight cases of scarlet fever and five cases of diphtheria, and only one death from scarlet fever.

No such immunity from these diseases has occurred for a quarter of a century. We do not follow the practice adopted in some towns and cities of reporting typhoid fever, but so far as I know very few cases have occurred here during the past year; speaking for myself I have not had a single case. Remittent or continued fever has prevailed to some extent, but most of the cases have been mild and nearly all recovered.

The plan of systematically cleaning up the town during the month of May was repeated with very satisfactory results. The want of a dumping ground for garbage as well as for night soil was greatly felt and I trust a suitable place will be purchased before another season. I think the time has arrived for the erection of a more suitable building for contagious diseases; experience has shown that a building for this purpose can be used with safety within a few hundred feet of other houses, and as the present building is not at all suitable for more than one disease and not at all comfortable for any, I would ask your honorable body to appoint a committee to take the matter into consideration and report at as early a day as possible.

The Board of Health has by resolution condemned the slaughter house on McDougall street and ordered its removal. This will be a great relief to the inhabitants of the back part of the town who have suffered for years from the terrible stench, to say nothing of the depreciation in the value of property beyond the coterie, caused by this old time nuisance.

The new inspector, Mr. Giles, has done excellent work and shown great aptitude for the situation.

It may seem superfluous for me to state in this report to the body who has done the work that 12,435 feet of water main have been added this year and 6,892 feet of brick and 1,400 feet of tile sewer have also been constructed, 109 connections from private property with the public sewers have been made this year, and yet I think I am within the mark when I say that one-third of those who should connect have not done so, but continue to empty their slops at their kitchen doors.

The nominal effort made to abate the sewer gas nuisance at the foot of Ouellette street can hardly be considered as a permanent remedy, and as the owners of the dock object to carrying the sewer into the free current, I would suggest the construction of a flushing tank at the upper end of Ouellette street sewer, to be used once a week in dry weather. This would remove the accumulation of the sediment which causes the smell and would not be an expensive undertaking. Even this may not meet the difficulty, but I would respectfully suggest that the remedy should be looked for rather in the direction of a removal of the cause, than a provision made for a removal of sewerage.

JOHN COVENTRY, M.D.,
Medical Health Officer.

VILLAGES.

ALEXANDRIA.

SECRETARY'S REPORT.

I beg to report that there was an outbreak of typhoid fever, seven cases, in the latter part of the summer, caused by the affluvia from the mill pond, at the west side of the village, which had been allowed to run dry. A thorough, general inspection of all premises was made twice during the year, while there were three cases of complaints of nuisances which were promptly attended to and remedied.

ALEX L. SMITH,
Secretary.

ALVINSTON.

MEDICAL HEALTH OFFICER'S REPORT.

In my report of last year, I entered somewhat fully into several matters to which it will not now be necessary to allude. The year just closing has been one of the healthiest in the history of the village. During the year a sewer was constructed on Centre street. This was a much needed work. If properly constructed, and will do its work as expected, it will drain a large area, much to the improvement of cellars and drinking water.

Lately mumps have been endemic, and although a few persons have been quite ill, there have been no deaths. Recently scarlatina broke out in our midst. The first case was that of a child on a visit with its mother. The contagion has spread to several houses, and there is the greatest danger of it further spreading. The general opinion seems to be, that once a red card is put up all danger ceases. There seems to be no thought of keeping at home any but the sick, the other members of the family being permitted to take to the streets just as they please. It is needless to say this is far from complying with the law. There is culpable neglect somewhere. I find, notwithstanding explanations made in my report last year that a large number of people still believe that there are two diseases, having some points in common, one called scarlatina, the other scarlet fever. This is wholly a delusion. Fortunately no deaths have so far occurred, but at this season of the year, that cannot be long said. I would earnestly urge our Board to enforce the law. Scarlatina and all zymotic diseases are apt to be more virulent in winter, owing to the comparative lack of ventilation.

I would draw attention to the immunity enjoyed by the residents of Alvinston from consumption. During the last eight years, I can recall but five deaths from this cause. Two of these were laboring under the disease on removing here. This shows a record not excelled by any other place of equal population.

ANGUS MACKINNON, M.D.,
Medical Health Officer.

ACTON.**MEDICAL HEALTH OFFICER'S REPORT.**

The inspection of the town shows a very satisfactory sanitary condition. The drainage system is in good order. No offensive accumulation of any kind within the municipality. Cellars well cleaned. In a few cases I would recommend private drains from the cellar to the main drain owing to a damp condition of the floor and walls, caused by stagnant water at certain seasons in the cellar. During the month of August, typhoid fever broke out, due no doubt to the deplorable state of the slaughter-houses; their removal was recommended, and immediately executed. This, with other precautionary measures had a beneficial effect, only three cases of fever occurring and none since that time.

I am pleased to be able to state that the town has been entirely free from contagious diseases of all kinds during the past year. The rate of mortality has been very low, most of the deaths occurring among those far advanced in years.

The water has been found to be pure. The amount of calcium carbonate in the soil acting as an absorbent of impurities and counteracting their effects.

C. E. STACEY,
Medical Health Officer.

BATH.**MEDICAL HEALTH OFFICER'S REPORT.**

I have the honor to report that the sanitary condition of the municipality for the current year has been extremely satisfactory. No serious contagious disease has prevailed. There have been a few cases of scarlatina, and the ordinary precautions have been taken to limit the spread of the same. The municipality is to be congratulated on the absence of any serious disease during the present year.

B. KENNEDY, M.D.,
Medical Health Officer.

BLYTH.**MEDICAL HEALTH OFFICER'S REPORT.**

I have the honor to report that our village has maintained its reputation for healthfulness during the past year. That the deaths have only been eight, or less than one per cent. which is below the average. With the exception of a few cases of typhoid fever which proved to be of a mild character, we had no epidemics of any kind. The Board of Health is properly organized and ready for any emergency; but the sanitary condition of the village is so satisfactory that no complaints have been made during the past year, and hence no official action has been required.

WILLIAM SLOAN, M.D.,
Medical Health Officer,

BELLE RIVER.

CHAIRMAN'S REPORT.

It is gratifying to me as Chairman of the Local Board of Health for the current year to be able to report so favorably on the sanitary condition of our village.

We have had no cases of contagious diseases during the year to this date.

The chief complaint during the early part of the summer arose from the decaying manure, and slaughter-houses, as these complaints were mostly verified by inspection by some member of the Board, it was ordered that the Health Act be enforced.

The general health of Belle River is, and has been good notwithstanding the unusual scarcity of water throughout the whole village.

I think I may reasonably conclude that the efficiency of our inspector, and the willingness of the inhabitants generally to attend to the sanitary matters when desired, have in a great part been the cause of our surprising freedom from contagious diseases.

E. V. DECAIRE,
Chairman,

DUNVILLE.

SECRETARY'S REPORT.

I have the honor to submit herewith the annual report of the Board of Health, and in doing so would say that our municipality has been unusually free from contagious diseases. The death rate of the past year has been smaller than in any year during my incumbency of office, a period covering six years. We have had only thirteen deaths, and of those, eleven were infants, cholera infantum carrying off 8; water on the brain, 1; cerebro spinal meningitis, 1; accidentally killed, 1; while the death of but two grown persons were reported, viz., found dead, 1; peritonitis, 1.

The total of contagious diseases reported were, diphtheria 5; measles, 6; scarlet fever, 2; none of which proved fatal. We found on our annual visit of inspection which began on May the 15th, 36 privies, 14 manure heaps, 18 back yards and 9 drains which required attention, all of which were attended to by the persons interested; and by constant diligence throughout the year, we have been able to check any irregularities as they arose, and now report our town in fair sanitary condition, and free from contagious diseases.

J. W. HOLMES,
Secretary.

CHIPPAWA.

SECRETARY'S REPORT.

The health of this municipality for the present year has been good. No complaints requiring the action of the Board have been received. We have had no cases of diphtheria, scarlet fever, or typhoid fever, for the last ten months, and we have not been visited by any epidemic. There have been but two deaths, and they were old people.

WM. GREENWOOD,
Secretary.

CARDINAL.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting my annual report as Medical Health Officer, I have to congratulate the people of our village on their immunity from any epidemic of either contagious or infectious diseases during the past year.

The usual complaints of offensive premises, neglected privies and defective drains were promptly attended to by the sanitary inspector.

I feel bound to call the attention of our Board to the prevalence of hog-pens in our midst. Several complaints have been made about these pens, and as yet no action has been taken. The stench arising therefrom during the warm weather is enough to cause a plague. It is to be hoped that our Board will take the matter in hand and rid us of this nuisance.

DUNCAN GOW, M.D.,
Medical Health Officer.

EXETER.

SECRETARY'S REPORT.

In making my report I am pleased to say that the people of this village are learning that it is in the best interests to work harmoniously with the requirements of the Board of Health, indeed, as a Board we have had very little trouble in enforcing sanitary measures, particularly so since your visit to this village. I must say, however, that owing to the lateness of the season and frequent rains, it was thought best not to press the matter of a tile drain in the bottom of the creek running through the village until next summer, when we hope the council will comply with your requirements. From the Medical Health Officer's report I glean the following:—That the sanitary condition of the village for the past year has been good, beyond the ordinary causes over which we have no control. There have been ten cases of typhoid fever, nine of which have recovered, and one in a fair state of recovery. One case of diphtheria, also ending in recovery. At present there is not a single case of contagious disease reported in the village.

M. EAORETT,
Secretary.

FERGUS.

MEDICAL HEALTH OFFICER'S REPORT.

The health of our municipality for the present year is most gratifying. We have been almost completely free from the worst forms of contagious diseases, having no deaths, and only two or three very minor cases of diphtheria, scarlet fever and measles. There has been very little work for the Board of Health. A few nuisances were complained of, and were at once ordered to be removed. Typhoid fever has been more or less general all over the Province and we unfortunately have not escaped. Strange to say, it has been confined to the northern and highest part of the village, several houses being afflicted. Careful inspection and examination fail to show any general cause for its prevalence. The milk and water supply were separate, drainage was good and the premises belonging to those affected, were more than usually well kept and clean; and we at present cannot account for the trouble. It has been noted very often with us that typhoid follows the use of a new well and a new log pump; and it is a question whether the green woody fibre may or may not be one of its agents. Our experience would say it was, but why we cannot say. We again repeat the necessity of prohibiting cesspools and privy vaults, and would insist on a more thorough inspection of the different yards, etc., in all parts of the corporation.

W. H. JOHNSON, M.D.,
Medical Health Officer.

MILLBROOK.

SECRETARY'S REPORT.

I beg to report that the sanitary condition of the village has been good for the past year.

There has been no outbreaks of contagious diseases, and very little sickness of any kind with the exception of two cases of diphtheria, one of them fatal.

There is a large sewer running through the main street of the village that carries off a large amount of sewage, etc.

The village is well supplied with an unlimited amount of pure spring water.

There was a complaint laid before the Board with reference to a quantity of stagnant water. The complaint was attended to at once, and the water removed. No other complaint made.

The sanitary inspector and medical health officer attend to their duties in a very satisfactory manner.

W. TURNER,
Secretary.

MORRISBURG.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting you with my annual report on the condition of the health of the inhabitants of this village, I am happy to say that the past year has been an exceptional one. So far as I know not a single case of infectious or contagious disease of importance has visited our village, and at this time the sanitary condition of the municipality is in a very satisfactory state.

T. F. CHAMBERLAIN, M.D.
Medical Health Officer.

MERRICKVILLE.

MEDICAL HEALTH OFFICER'S REPORT.

I have the honor to report that the public health in the municipality of the Village of Merrickville has been generally satisfactory during the year. No endemic cases of infectious or contagious diseases have been noted, with the exception of whooping-cough, and a single imported case of typhoid fever. The whooping-cough was likewise imported from a distance, and spread to a limited extent, causing one death in an infant under six months. The sanitary condition of the village is satisfactory. The annual drawing off of the waters of the Rideau river by the government at Ottawa, leaves us exposed to attacks of malarial diseases.

M. K. CHURCH, M.D.,
Medical Health Officer.

MARKHAM.

MEDICAL HEALTH OFFICER'S REPORT.

In making my annual report I have to congratulate our Board on the immunity from contagious diseases enjoyed by this municipality during the past year, for beyond two isolated cases of diphtheria of a comparatively mild type, none have been reported. These cases were promptly quarantined, with the result of putting an end to the disease. In the matter of closets there is a great improvement since my last report. I would again urge upon you the advisability of adopting earth closets in many of the more thickly populated portions of the village, as many are in dangerous proximity to wells of drinking water, and may at any time prove a source of disease.

M. ROBINSON, M.D.
Medical Health Officer.

NIAGARA FALLS.

SECRETARY'S REPORT.

I have the honor to report that the sanitary condition of this municipality during 1889 has been exceptionally good. The sanitary inspector was very zealous in the discharge of his duties, and reports that the inhabitants cheerfully and promptly complied with any suggestions made by him. He made a house to house inspection, caused hog-pens and water-closets to be cleaned, and holes containing stagnant water to be filled, and premises generally to be kept in a state of cleanliness. He further reports that the keeping of hogs within the limits of this municipality will soon be a thing of the past, and says that this village is one of the cleanest in Ontario.

M. B. MORRIS,
Secretary.

OIL SPRINGS.

MEDICAL HEALTH OFFICER'S REPORT.

In March last malignant diphtheria made its appearance in our midst, and by most stringent quarantine regulations it was confined to one house. Of the four cases that occurred two proved fatal.

The Board of Health deserve great credit for the stringent and efficient means they adopted for stamping out the disease.

Otherwise the village has been remarkably free from contagious and infectious diseases.

A. R. HANKS, M. D.,
Medical Health Officer.

PRESTON.

SECRETARY'S REPORT.

Our health inspector made his annual inspection and found the sanitary condition of our village very satisfactory, with the exception of two or three cases, which have been attended to by our Board of Health.

We have had a few cases of scarlet and typhoid fever of a mild form, none of which proved fatal.

The mortality during the year has been very low.

W. A. HUSBAND,
Secretary.

PORT ELGIN.

MEDICAL HEALTH OFFICER'S REPORT.

Since last annual report the general health of our village has been remarkably good, no cases of diphtheria, scarlet fever, measles, whooping-cough, or mumps having occurred even to date. During September, October, and November up to present writing, (Nov. 14th) we have had a few cases of typhoid fever of a mild type, none directly fatal, and only one indirectly.

The dry-earth system of water-closets has been adopted with very few exceptions. The citizens, however, have in many cases been too sparing with their earth, ashes, deodorants and disinfectants, but our sanitary inspector will see that this matter will be better attended to in the future.

Our Board of Health is a live one, looking after the sanitary interests of the village with an intelligent zeal worthy of their important office.

In Mr. Angus Currie we have had for a number of years an eminently efficient sanitary inspector, faithful in the discharge of his duties, universally respected and obeyed in carrying out the regulations of the Board without having had, in any single instance, to invoke the law.

As to the neatness and cleanliness of our streets and alleys, we do not fear a comparison with any other Ontario village or town.

CHAS. SHUPE, M. D.,
Medical Health Officer.

POINT EDWARD.

SECRETARY'S REPORT.

It affords me much pleasure to be able to state that the duties of the Board of Health for the past year have been merely nominal. Early in the spring the Board caused the sanitary inspector to call upon the villagers and notify them to clean up their premises. This with very few exceptions was cheerfully complied with. During the latter part of August and September there were eight cases of typhoid fever. One proved fatal. No other diseases of a serious nature were reported, and the village is believed to be in an excellent sanitary condition.

W. MITCHELL,
Secretary.

PORT STANLEY.

MEDICAL HEALTH OFFICER'S REPORT.

During the year ending Nov. 1st, 1889, the village has been remarkably free from disease, with the exception of whooping-cough during the winter of 1889. Four cases of typhoid fever were reported, two of which were contracted in London, and one was contracted by a girl having to pass a slaughter-house, which was situated in the village about forty yards from the street. I recommended the Board of Health to remove it in the spring, but it failed to take action till September.

We have been troubled by a stench arising from the holes where the owners of the steam fisheries dump the offal and dead fish. The Board has prohibited them from doing so, with the result that it has not been so bad this year as formerly. Still they occasionally break the instructions of the Board.

There is another matter to which I would like to call the attention of the Provincial Board, that is the condition of the harbor, which is leased by the Grand Trunk railway.

It has been allowed to fill up with a deposit from the sewers of the city of St. Thomas, and during the heated term there is quite a stench arising from it.

During the epidemic of smallpox in the adjoining municipality of Southwold the village was guarded and no one from the infected district was allowed in to the village.

I made a house to house inspection and vaccinated all the inhabitants, men, women, and children.

There has been no deaths from contagious diseases during the past year.

L. J. MOTHERSILL, M.D.,
Medical Health Officer.

SOUTHAMPTON.

MEDICAL HEALTH OFFICER'S REPORT.

It affords me much pleasure to be able to report, that during the past year our village has not been visited by any diseases of either a contagious, or infectious nature, except a few cases of whooping-cough in the spring. The very excellent sanitary state of our village I attribute to the purity of the water supply, the pure air from Lake Huron, and the perfect drainage obtained through the coarse bed of sand, on which the village is built. Sanitary regulations are well observed by the inhabitants.

WILLIAM S. SCOTT, M.D.,
Medical Health Officer.

STOUFFVILLE.

SECRETARY'S REPORT.

We have this year enjoyed perfect freedom from all epidemics. I am not aware of a single case of contagious disease having existed in our village this year. In 1888 as you are aware, we had two cases of smallpox that cost the Local Board of Health a great deal of anxiety and extra trouble; but with great care we kept it confined to the one house and family. Unfortunately, however, our experience and trouble with the affair was not as easily controlled as the disease itself. This last spring, a suit was brought against the Local Board of Health to recover \$1,500 damages for the isolation of a person who had been exposed, and although the plaintiff was not successful in sustaining the charge against the Board, an award being made in favor of the Board, that he the plaintiff, should pay all costs, and he was not worth anything, the entire expense, nearly \$500 has fallen upon the village, with but little or no hope of ever recovering it again. This case alone shows the great importance of having all legislation in a form well calculated to afford every possible protection to the Local Boards of Health, and indeed, to any person who assist in any way in promoting the sanitary interests of a municipality.

HENRY W. WOODGATE,
Secretary.

STIRLING.

MEDICAL HEALTH OFFICER'S REPORT.

I have the honor to report that the sanitary condition of the village of Stirling, has been good during the past year.

That no contagious or infectious diseases have been prevalent or reported to me. No nuisances have existed within the corporation to my knowledge.

G. H. BOULTER, M.D.,
Medical Health Officer.

STREETSVILLE.

SECRETARY'S REPORT.

In May and June, a house to house visitation throughout the village was made by the Sanitary Inspector, who reported that he found the dwelling-houses and premises generally in a satisfactory condition. In October, the Board instructed the inspector to make another inspection of the municipality, but no report of such inspection has yet been received.

At the date of the last annual report an outbreak of diphtheria existed in the village. At the close of 1888, there were still several cases, and there were two deaths in the first week in January. After that time there were reported two cases of diphtheria, which were followed by recovery, and one case of diphtheritic croup, which proved fatal. With the aid of the physicians in attendance on the patients, every means was used as to isolation, disinfection, as well as cleansing of premises for preventing the spread of the disease. After January no fresh cases were reported, and since then the village has been free from any infectious disease, with the exception of a few cases of whooping-cough. During the summer and autumn, the health of the village has been particularly good. The village council has passed a by-law to prevent any interments taking place after the 31st December, 1889, in the overcrowded burial ground in the east end of the village, to which reference has been made in previous reports.

The nuisance hitherto complained of in connection with slaughter-houses in the village is undergoing abatement. One slaughter-house has already been removed to a field in the south corner of the village, at some distance from any dwelling-house, where it has been placed with the permission of the Council and the Local Board of Health, subject to the proprietor's complying with the provisions of the Public Health Act, and the conditions contained in Schedule A appended to the said Act,

Another circumstance in favor of the sanitary condition of the municipality is the diminished number of piggeries. While there were about fifty hogs kept in the village in 1885 and 1886, according to the assessment roll, there were only nine at the time the assessment was made last spring.

WM. J. PINNEY,
Secretary.

THEDFORD.

SECRETARY'S REPORT.

The general health of the inhabitants I am happy to say has been good. All circulars and correspondence received have been invariably read to the Board. Well water supplies the village for drinking purposes, and is sharply looked after that it be kept pure and wholesome. Drainage and water courses are attended to by our engineer. The Board met five times during the year. There has been eight deaths during the year, all advanced in life between sixty and ninety years, except an infant who died of spinal paralysis.

The sanitary condition of the village up to the present has been excellent, and the residents are encouraging the Board of Health and stimulating them to vigilance in their duties.

H. M. WATTSON,
Secretary.

WATFORD.

MEDICAL HEALTH OFFICER'S REPORT.

In accordance with the provisions of the Public Health Act I beg leave to report as follows :—

In the early part of the year a few cases of measles occurred, but of mild type with no fatal results.

The drought of summer and early autumn reduced the water supply and a few cases of typhoid fever occurred, eleven in all, the result of drinking impure water. Two cases fatal, one of them a child had severe brain complication from an early stage which hastened its death. None became affected by contagion.

The sanitary inspector made no report, and some comments in paper led the Board to appoint Mr. Reid to make a thorough inspection. His report was published in *Guide Advocate* and showed that the municipality was in very good state.

The health of village as a whole has been good, but the necessity for a better system of drainage has manifested itself on several occasions.

ROBERT GIBSON, M.D.,
Medical Health Officer.

WATERDOWN.

MEDICAL HEALTH OFFICER'S REPORT.

As Medical Health Officer it becomes my duty to report on the state of the health of the people of this municipality for the year just closing. Very few deaths have occurred, and only one from infectious disease. This happy state of affairs is no doubt due to the action of the Board at different times in the past in improving the sanitary condition of the village. This year in accomplishing the removal of the slaughter-house situated at the west boundary of the village, which has always been a menace to the health of this community, our freedom from epidemics and our very low death-rate will no doubt be continued.

On one point only would I counsel our Board, and that is to take action during the coming year to prevent the building of vault water closets, which have certainly at different times contaminated the wells of the village, as several cases of typhoid have been traced directly to this cause, and they will be a continually growing danger if allowed. The dry earth or ash closet with cleaning at least once each year, as the Health Act provides, is the only safe closet for a village community.

J. D. COURTENAY, M.D.,
Medical Health Officer.

WIARTON.

MEDICAL HEALTH OFFICER'S REPORT.

The sanitary condition of the village has been particularly good, owing principally to our sanitary inspector, Mr. Hull, and our diligent clerk, Mr. T. Galloway, having made two inspections of the entire village, and enforcing rigorously in every case the instructions of the Local Board of Health. We have been almost entirely exempt from all diseases of a contagious character as compared with last year, when we had a considerable number of cases of fever of a typhoid form, owing I think to bad well water.

I attribute the almost entire freedom of our village this year from fever to our splendid system of water works. What we require now is a properly constructed sewer system, a closing up of all wells used for drinking purposes, the entire abolition of privy pits and cesspools. If these suggestions were carried out I am satisfied we would have a village second to none in the Dominion in a sanitary point of view.

R. M. FISHER,
Medical Health Officer.

WARDSVILLE.

MEDICAL HEALTH OFFICER'S REPORT.

I have to report the present condition of our municipality free from all contagious diseases. We did have diphtheria here for some years back, but for months past no cases have made their appearance. Our district has been more than healthy for months past.

GEORGE GORDON, M.D.,
Medical Health Officer.

WELLINGTON.

CHAIRMAN'S REPORT.

This fall is the first time since the passage of the Health Act that any formal complaint has been made to the Board, and it was in relation to a slaughter-house and three or four privies. On investigation and warnings being given the slaughter-house was abandoned, premises cleaned and disinfected. The privies were also attended to.

The general health of our village has been good, owing largely no doubt to the pure, fresh, bracing air of Lake Ontario, on the very shore of which we are located.

BARL. WISTAR,
Chairman.

TOWNSHIPS.

ADMASTON.

SECRETARY'S REPORT.

I have to report that the sanitary condition of this municipality is so good that the council have not appointed any medical health officer for the present year. The Local Board have met only once, as there were no complaints handed in to any of its officers during the year. There has been but one case of typhoid fever and the patient is recovering, and there is apparently no danger of it spreading any further. There is not, nor has there been, any other contagious diseases in the municipality that I am aware of during the year.

JOHN CONNOLLY,
Secretary.

ATHOL.

SECRETARY'S REPORT.

I have the honor to inform you that the Local Board of Health for the township of Athol have had nothing to do during the year now drawing to a close. There has been no outbreak of infectious or contagious diseases, nor has any notice been received of the existence of such diseases. The sanitary condition of the municipality is excellent.

W. MOORE,
Secretary.

AMELIASBURG.

MEDICAL HEALTH OFFICER'S REPORT.

I have again to congratulate our Board on the general good health which has prevailed throughout the township during the year, and the light duties required of the health officers in consequence.

There have been two or three cases of typhoid fever and a case or two of diphtheria reported it is true, but they were isolated cases and did not take on an epidemic form. Whooping-cough has been prevalent in some parts of the township, but of a mild form and seldom requiring medical treatment; in fact, whooping-cough is not a very serious disease amongst the healthy rural population of which this health district is chiefly composed.

Some matters come have to my notice which I did not deem of sufficient importance to report to the Board, but you can rest assured that any matters of importance relating to the health or sanitary condition of the district will be promptly laid before you.

A. J. FILE, M.D.,
Medical Health Officer.

ALBERMARLE.

SECRETARY'S REPORT.

We have the gratification (which has been usually our good fortune) of reporting the entire absence of all contagious or infectious diseases in this municipality.

There have been a few more deaths than in the preceding year, but they have been chiefly from natural causes, which fact, we believe, speaks much in favor of our salubrious climate and pure water. Our healthy condition may also be partly attributed to the efforts of our respective sanitary inspectors, in guarding against the existence of any matter or thing that might be injurious or detrimental to the public health.

The services of our medical health officer have not been required, and in consequence this Board have deemed it entirely unnecessary to have a report from said officer for the present year, thereby saving the expense of the same.

CHARLES WHICHER,
Secretary.

ALDBOROUGH.

SECRETARY'S REPORT.

Two sanitary inspectors having been appointed by the municipal council of the said township, one for the west and the other for the eastern division thereof, your Board did cause a thorough examination and inspection to be made by the inspectors, of all cellars, wells, privies, cheese-factories, and slaughter-houses, in the township, and where necessary did cause the same to be put in a proper sanitary condition, in which condition they now are.

On or about the 20th of February smallpox was introduced into this township by a family coming from the township of Southwold, in which the disease was then raging, and broke out in the village of West Lorne. Your Board in conjunction with the township council took prompt and decisive measures to stamp out and prevent the spread of the disease. A physician was specially engaged to attend the persons afflicted. Compulsory vaccination was introduced. A strict quarantine of all persons afflicted with or who had been exposed to the disease, and of all buildings infected therewith, was established, and efficient guards were placed on the leading roads in the township to prevent the ingress and egress of all persons to and from the infected districts. Your Board are pleased to say that the means employed were effectual in confining the disease to the house and family in which it originally broke out. There were only two cases of smallpox altogether, and no deaths therefrom. On the recovery of the persons afflicted the building in which they had been while ill was burned, as well as all clothing, furniture, and other articles infected, and every portion of the premises, including the soil in which refuse from the house had been buried, was thoroughly disinfected.

The number of cases of contagious disease in this township, considering its extent and population, during the current year have been comparatively small, the deaths resulting therefrom being only four. The health and sanitary condition of the community are, generally speaking, satisfactory.

Your Board feels bound to mention the fact that local physicians are not as prompt as they should be in reporting cases of infectious diseases coming under their notice to the medical health officer. Several cases of this kind have come to the knowledge of individual members of your Board during the current year, happily, however, after all danger of the spread of the contagion had ceased.

The work of your Board being much heavier, and involving far greater responsibilities than in former years, necessitated the holding of nine meetings, and the expenditure of some \$1,200.

H. F. JELL,
Secretary.

ANCASTER.

SECRETARY'S REPORT.

I take great pleasure in reporting that this municipality has been in a very healthy state during the whole of the past year, and that its sanitary condition is most satisfactory.

The system of requiring persons to apply for permits who carry on the business of slaughtering, dairying, cheese-making, etc., followed up by proper inspection, has had a good effect in checking and preventing nuisances of this kind.

JOHN HESLOP,
Secretary.

ADELAIDE.

SECRETARY'S REPORT.

It is gratifying to me to state to you the entire absence from our township of all infectious or contagious diseases during the year; in fact it has been the most healthy period that it has been our good fortune to be blessed with since the formation of the Board of Health for the township. Cheese factories have been examined by the sanitary inspector and put in a sanitary condition. The health and cleanliness of the township is good.

WM. MILLER,
Secretary.

BRANT.

SANITARY INSPECTOR'S REPORT.

I beg leave to present a summary report of the work I have done as sanitary inspector during the present year up to date. I have been out inspecting twenty-six days altogether. I have travelled over three hundred and eighty (380) miles, and in doing so I have made two general inspections of the cheese and butter factories, slaughter-houses and villages. When, after inspection, I recommended to the Board that permits be granted to the several parties who were carrying on the business of the factories and slaughter-houses. The villages, or rather the parts of some of them which belong to your corporation, viz.: Elmwood, Hanover, Cargill and Edengrove, I inspected in the spring and fall, and in so doing I made a personal inspection of one hundred and seventy-three (173) private and public yards. Ninety-nine of these were properly cleaned up; the remaining portions of them, with very few exceptions, were in a fair sanitary condition. I inspected forty-five wells. Nineteen of these were cleaned out in accordance with the requirements of the law. I received fair promises from the parties who owned the remaining portion that they would have them cleaned out. During the year I inspected over one hundred water-closets. About one-third of them were in good condition, and the majority of the rest in a fair state, yet some of them were not so clean as they should be. I received several notices complaining of different kinds of nuisances, the greater number of which I attended to.

It may be out of place for me to speak of the health of our township, as our medical health officer no doubt will report that in full; but it is very gratifying to know that we have had so very few cases of typhoid fever, while it has been so prevalent around us. When I was in Hanover I was informed on good authority that there were six or seven cases of it on the Bentinck side. Some of them, as reported, were of a malignant nature.

and I feel happy to be able to state that there was not one case of it on the Brant side. After taking the township as a whole I am safe in stating that it has vastly improved in a sanitary point of view since our Board was first established. All we could wish for has not been accomplished, yet a very great deal has been done already, and we hope that it will still go on improving. No doubt there are still a few kickers here and there, but they are getting fewer and fewer every year, and on the other hand there are many who are glad to see me coming around.

During the year I have had to serve eight notices on parties on account of the existence of nuisances.

JAMES NESBITT,
Sanitary Inspector.

BEVERLEY.

MEDICAL HEALTH OFFICER'S REPORT.

It affords me much pleasure to state that in my experience of eight years I have never before known a year as free from diseases of an epidemic or infectious nature. In the month of January, however, the south-eastern portion of the township was visited by that terrible scourge diphtheria, which fortunately was confined to one habitation alone.

Every precaution that sanitary science and common sense could suggest, coupled with the most rigid rules of quarantine or isolation were enforced, with the happy result as above stated. Two of the oldest of the family and the youngest succumbed to its terrible onslaught in a few days, apparently dying from heart failure or the effect of the poison on the heart, muscle or nerve, rather than asphyxia. In each case death was preceded by some sudden exertion such as sitting up in bed, or in the youngest child struggling against the treatment of the throat. This was carefully guarded against and the parents warned to enforce absolute quiet. The remaining child, whose symptoms were of an extremely mild type, even if they were the symptoms of diphtheria at all, as he had scarcely any constitutional disturbance whatever, recovering in two days. After these occurrences there were a great many reports circulated of not a few cases of the same nature, but I am satisfied that they were simply follicular sore throat, as they all recovered and were out in from one to three days, and I am of the opinion that they were called diphtheria by some over-zealous persons anxious to gain notoriety. The balance of infectious and contagious diseases reported were a few cases of scarlet fever and measles, with six cases of typhoid fever and a few cases of malaria. The typhoid and malaria were directly traceable to defective drainage in the village of Lynden, where the case mentioned occurred. From a sanitary standpoint Lynden was and will be again next spring in a most deplorable condition, owing to ponds or large cess-pools where filthy surface water collects, which fairly reek with the odor of decaying animal and vegetable matter, if the Board of Health do not take action in the matter next spring and compel each owner of property to keep the drains clear and open.

ALBERT E. STUTT, M.D.,
Medical Health Officer.

BOSANQUET.

MEDICAL HEALTH OFFICER'S REPORT.

I am pleased to be able to report that the sanitary condition of the township has been good. With the exception of a few cases of typhoid we have not had any contagious diseases.

With one exception, a slaughter-house which has been attended to, the condition of the slaughter-houses and cheese factories has been good.

The school-houses have been kept clean, with wells cleaned and out-houses well disinfected.

The people attend to all the rules of the Board with one important exception. Vaccination is not attended to as it should be.

W. A. MUNNS, M.D.,
Medical Health Officer.

BENTINCK.

SECRETARY'S REPORT.

The Board held three meetings during the year at which the various complaints made were dealt with. As the Board has no medical health officer to report cases of disease which may be prevalent, they have relied upon what they could gather from observation and other sources, and are pleased to report that the state of the public health of the township for the past year has been comparatively good. One case of diphtheria came under the notice and attention of the Board, and being of a malignant type it proved fatal, but the disease did not spread. There were several cases of typho-malarial fever in the township which may have originated from various causes, none of which terminated fatally.

DUNCAN CAMPBELL,
Secretary.

BROCK.

MEDICAL HEALTH OFFICER'S REPORT.

The work of the Board of Health during the past year has been of a very imperfect character, owing to the Board being without the services of an inspector for the greater part of the year. This we understand was due to a plea of economy on the part of the council. The result was, of course, no inspection of our village or municipality, and we were really not aware of its sanitary condition. A few places, however, became so bad that the neighbors were forced to complain to the Board, and an inspector was appointed a few weeks ago and the nuisance removed.

During the past year our municipality has been remarkably free from contagious diseases. Diphtheria and scarlet fever being conspicuous by their absence, and typhoid visiting us but three or four times. This we consider extremely fortunate as there is a feeling of antagonism towards the Board in our municipality and a tendency on the part of the council to submit to the public opposition, thus leaving the Board in a poor condition to cope successfully with epidemics or other difficulties that might arise.

In conclusion we must say that we cannot endorse the action of the council in neglecting the appointment of an inspector, and the annual house to house inspection, imperfect as it sometimes is, was sadly missed, and we trust that in the future nothing will be neglected that would tend to improve the sanitary condition of the municipality and thus preserve the health of the people.

DRS. McDERMOTT & FIERHELLER,
Medical Health Officers.

BOLTON.

SECRETARY'S REPORT.

Nothing of importance occurred requiring the action of the Board until the 2nd of August, when they were called on to visit certain residences occupied by the poorer classes said to be in a very dirty and unsanitary state.

The Board visited the premises complained of and found that the complaints were not exaggerated, and ordered the parties in occupation to immediately have their houses and premises thoroughly cleaned, which was complied with.

On a second visit the Board found everything satisfactory. In one case, owing to the infirmity of the occupant, the Board ordered the cleaning to be done at the expense of the municipality.

Some cases of typho-malarial fever in the suburbs were reported. The patients being isolated in their immediate neighborhood the medical health officer left it to the discretion of the Board to take action in the matter. Having visited the places reported the Board considered it unnecessary to take further precaution to prevent spread of the disease than had been done.

The owner of a diseased cow was notified to confine the animal to his own premises and have it destroyed, the animal being considered not fit to roam the village at large, vitiating the air while doing so. The owner failed to comply with the notice; the cow was killed and buried.

The general health of the village has been fairly good.

SAM'L. A. WALFORD,
Secretary.

BRUCE.

MEDICAL HEALTH OFFICER'S REPORT.

I have again to state this year that our municipality has enjoyed comparative freedom from epidemic diseases.

Typhoid fever broke out in a few families, also diphtheria prevailed in different localities, with only one fatal case. In so far as my attention was called to these two diseases I found the surroundings in a very unsanitary condition, so much so as to force the conclusion that these diseases were due to local causes.

I still find that the physicians are neglecting to report the cases under their care.

A. MACKAY, M.D.,
Medical Health Officer.

BLANSHARD.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting to you my annual report, I desire to draw your attention to the good health with which we have been blessed during the year.

This much to be desired condition is no doubt largely due to the active interest displayed by our Board in dealing with those unsanitary conditions which if left unheeded produce diseases of various forms, and in taking active precautions against the spread of epidemics as soon as their presence becomes known.

Scarlet fever, the only epidemic which seriously threatened us, broke out in McIntyre's school in the month of March. It was of a mild type, and on this account made its appearance in the school-house before its presence in the section was known to the public.

At first intimation of the disease a meeting of the Board was held. We closed the school, isolated the affected families, disinfected and cleansed the closets and school-house, and so successful were we in the measures taken to prevent the disease spreading that it was wholly confined to the families affected when the school was closed. We resolved at this meeting to have such extracts from the Health Act as referred to the duties of teachers, parents and others, printed and hung up in each school-house in the municipality. This was immediately attended to, and now teacher and children know the law in this respect and act upon it. The result following the interest taken by the Board in this case and similar ones has proved conclusively to the ratepayers the great value of the sanitary work we are accomplishing.

Typhoid fever made its appearance in but two families, and only one member in each family was attacked. In each case the fever ran a course of about five weeks and resulted in recovery.

One contracted the fever while on a visit near Hamilton, the history of the other case was not obtained.

Proper precautions were taken to disinfect and prevent the disease spreading.

German measles made their appearance in the Woodham section in the month of May, but beyond the inconvenience to families attacked, produced little sickness except in two cases, where an adult was the sufferer and where a sickly child was very seriously ill from the attack.

Diarrhoeas of a severe type were more prevalent during the summer and autumn months than for years previous, but the mortality was much below the average.

We have had no cases of diphtheria this year.

Members of the Board report the schools, school grounds and closets in all the sections but one in first-class sanitary condition. This single exception has been a source of complaint for years owing to want of drainage. No heed having been taken to previous recommendations the trustees were notified that unless the matter was at once attended to the law would be put in force. This had the desired effect, and we hope when spring, with its superabundance of water appears, this ground will shew the benefit of good drainage.

Dairies, cheese factories and butter factories and slaughter-houses require more than passing notice, and the provisions of the Health Act regarding these industries should be prudently enforced.

I would again draw the attention of this Board to the fact that a large percentage of school children are not possessed of a vaccine mark. As a Board of Health we should see that the Act respecting vaccination is rigidly enforced. We cannot estimate the amount of trouble that would thus be saved in the event of an outbreak of smallpox.

W. IRVING, M.D.,
Medical Health Officer.

BROOKE.

SECRETARY'S REPORT.

The Board met and organized on the 16th February. Committees were appointed to inspect and report upon the two cheese-factories doing business in the township, which was done, the conditions of factories and surroundings being fairly satisfactory.

On the 21st September a special meeting of the Board was held to consider complaints relative to the filthy and offensive state of a slaughter-house on lot 18, concession 6, just west of the corporation boundary of the village of Alvinston. In accordance with

a resolution of Board then passed I wrote the parties using same that if it was not cleaned up and kept clean, action would be taken under section 63 of the Health Act, R. S. O. 1887. I understand from Mr. Bowlby, who was appointed to inspect same, that they complied with request, though somewhat tardily.

I am not aware of any smallpox, fevers or diphtheria being in existence in the township, now nor at any time during the year. The general health of the inhabitants is very good.

I regret to have to notice the removal of one of our colleagues by death. Mr. Lovell had held responsible positions both in the municipal council and the agricultural society, and at the time of his decease was a member of this Board.

W. G. WILLOUGHBY,
Secretary.

BEDFORD.

MEDICAL HEALTH OFFICER'S REPORT.

My report for 1889 must necessarily be brief owing to no cases of contagious disease having come under my notice, with the exception of a few cases of whooping-cough which at present exist in the vicinity of Crow Lake. These, however, are thus far of a mild form.

The municipality is to be congratulated on its excellent sanitary condition.

A. W. DWYRE, M.D.,
Medical Health Officer.

BLENHEIM.

CHAIRMAN'S REPORT.

We have much pleasure in stating that our township has been comparatively free from any epidemic. A few isolated cases of mild typhoid reported. None of them proved fatal. Precautionary measures were taken and the disease did not spread. No diphtheria reported during the year, nor any other contagious or infectious diseases.

The committees of the Board during the year have visited the school houses and slaughter houses, and found them in a satisfactory condition, and the trustees and proprietors in all cases willing to comply with the requirements of the Act. The Board has succeeded in having all slaughter houses removed from villages to points outside.

We would suggest that the Provincial By-Law be so amended that the words "15th day of May" in Rule respecting hogs may read "15th day of April.

All of which is respectfully submitted.

W. R. PENTLAND, M. D.,
Chairman.

CARDIFF.

SECRETARY'S REPORT.

I beg to report that there have been very few deaths in this municipality during the year, and that they are all attributable to natural causes.

I have further to report that the lumbering firm of Rathbun & Co., of the village of Deseronto have built dams on the outlet of Pawdash and other lakes, thereby causing an amount of drowned land, and that the inhabitants in the neighborhood of these lands are complaining of the unhealthy smell following the letting off of the waters from said drowned lands.

A. W. WILLIS,
Secretary.

CHINGUACOUSY.

SECRETARY'S REPORT.

I have the honor to inform you that the duties of the Local Board of Health for the township of Chinguacousy for the current year have been light. The health of the inhabitants of the township has been good. There have been no outbreaks of infectious or contagious diseases so far as I know. The sanitary condition of the municipality is excellent.

The only complaints received by the Board were those respecting slaughter houses, which were attended to, and one case of stagnant water said to be a nuisance, which the Board ordered to be removed by the owner of the property on which it was situated.

ROBERT KEE,
Secretary.

CARADOC.

SECRETARY'S REPORT.

I beg to report that there have been nine cases of malaria fever, four cases of typhoid fever, three of which proved fatal, and one case of diphtheria, which proved fatal, within the township during the year. The case of diphtheria was caused by the house in which it occurred having been improperly disinfected when that disease was present in it on a former occasion. The house has since been properly disinfected. The township is free from epidemic and contagious diseases at the present time.

M. MCGUGAN,
Secretary.

DUMFRIES, SOUTH.

MEDICAL HEALTH OFFICER'S REPORT.

I am glad to say that at present the health of the township is good. During the last few months, we have had some cases of typhoid fever, only one terminating fatally. Two or three of them were near the Grand River, and we may ascribe the cause to the lowness of the water. The remaining cases were in the village of St. George and vicinity, arising chiefly from impure drinking water, for after an examination of a large number of wells I found the majority unfit for drinking purposes. I believe if the wells in this village had not had proper attention this season, an epidemic would have been inevitable. There have been a few cases of measles, but they were confined to one or two families. Four cases of scarlet fever occurred, but by a strict quarantine was kept from spreading and confined to one family. The public schools have all been inspected and found in a fair sanitary condition.

E. C. KITCHEN, M.D.,
Medical Health Officer.

MALDEN.

MEDICAL HEALTH OFFICER'S REPORT.

During the past year there have been no serious epidemics in the township. What might have been the beginning of an epidemic of diphtheria was, by the efforts of the Board, confined to the first house and to one child in the house. He was brought on a visit with his parents. The child was isolated, and none allowed to visit the place, and every sanitary measure carried out.

We have good cause for thankfulness because of the satisfactory sanitary condition of the township, and from the almost total immunity from diseases of an infectious or contagious character which we have enjoyed throughout the year.

T. JAMES PARK, M.D.,
Medical Health Officer.

CROWLAND.

MEDICAL HEALTH OFFICER'S REPORT.

This municipality is to be congratulated on the almost complete immunity from contagious or infectious diseases.

A very few cases of diphtheria, and so far as I can learn, 3 or 4 of scarlet fever complete the list of those dreadful diseases which but a few years ago brought such sadness to the homes of so many in the township.

I also note that the prejudice many people had against the posting of cards where contagious disease existed, is rapidly dying out and a desire to have the Act faithfully administered is now much more general.

J. W. SCHOOLEY, M.D.,
Medical Health Officer.

PERCY.

MEDICAL HEALTH OFFICER'S REPORT.

During this year there have been no diseases which required the attention of our Board or of the medical health officer. There have been one or two mild cases of typhoid fever and a few of a malarial type, none of which proved fatal.

During the month of May there was prevalent a form of bronchical trouble, which was apparently contagious. There was also a slight epidemic of roseola among children. Beyond the few cases enumerated above the health of the township has been exceptionally good.

J. M. CLEMINSON, M.D.,
Medical Health Officer.

PUSLINCH.

SANITARY INSPECTOR'S REPORT.

It is not necessary to give in detail all that was done during the current year, especially as the work was much on the same line as in previous years. Suffice it to say that during the month of May, and again in October, I visited all the villages in the township, and inspected every yard, etc., connected with the houses of the villagers, all slaughter-

houses, and school properties, including wells and water closets connected with the latter. All complaints of nuisances were promptly attended to and satisfactorily disposed of. During the early part of winter there were a few cases of whooping-cough in S. S. No. 5. One child fell a victim to the disease. The school was not closed but children from infected families were prohibited from attending. Again in October there were six cases of diphtheria in Morrilton, all of which recovered. It is difficult to account for the cause of the first case. Dr. Howitt and myself did all that we possibly could to prevent its further spread. With these exceptions the sanitary condition of the township has been very satisfactory.

ANDREW MUNRO.
Sanitary Inspector.

PORTLAND.

MEDICAL HEALTH OFFICER'S REPORT.

The general health of the township is good at the present time.

During the past year we had an outbreak of diphtheria. The usual precautions were taken and it was confined to two families. One of these cases proved fatal, There were a few cases of typhoid fever, one of which proved fatal, the others were of a mild type.

The township has not been visited by any widespread cause of death or sickness beyond the ordinary causes. There were no cases of scarlet fever, measles, mumps or whooping-cough reported.

E. McLAUGHLIN, M.D.
Medical Health Officer.

PELHAM.

SECRETARY'S REPORT.

The secretary was instructed to mail copies of a circular, printed and distributed last year, again this year to each physician practising in the township, and to each public school teacher therein, asking their co-operation with the Board to prevent the spread of contagious diseases, as well as a general observance of the health regulations.

There were less reports by physicians to the secretary than in former years.

In May Dr. Birdsall reported two cases of mild scarlatina, both in one family, the mother and eleven year old daughter. He caused the house to be placarded and cautioned the family to remain at home. Both recovered.

In October Dr. Emmett reported a case of scarlet fever and a case of diphtheria in the families of two farmers whose farms were adjacent to each other. He caused both houses to be placarded, think both recovered; although neither he nor Dr. Birdsall sent in reports of death or recovery.

In October Dr. Leitch, of St. Catharines, reported a case of typhoid fever, contracted by bad water, no report was received, but think patient recovered. Common report had it that there were a number of cases of typhoid fever in the same locality, (the north-east part of the township adjoining the township of Louth), but no other cases were reported by physicians to this Board. In November, however, the Local Board of Louth township, above referred to, by letter drew the attention of the Pelham Board to the prevalence of typhoid fever in the north-east part of Pelham—being the locality above referred to. Dr. Comfort, medical health officer of Pelham, thereupon visited the said locality and found a number of cases, most of them in the township of

Louth. He reported verbally to this Board that the one or two cases in Pelham were doing well and could safely be left to the physicians in charge. The newspapers at this time reported a very heavy mortality among adults from this disease in the locality referred to, (the border of Pelham and Louth), but no other cases were reported to this Board.

Two deaths in same locality were reported to the undersigned as Division Registrar, one by Dr. Downey, of St. Catharines, an adult male 24 years old, from typhoid fever, and the other by Dr. Jessup, of St. Catharines, a married man 31 years old, from typhoid pneumonia.

Three complaints of dead horses, as nuisances, were made during the year. In each case the sanitary inspector was notified, and that officer took such steps as he deemed necessary to remove the nuisances.

J. C. CROW,
Secretary.

PROTON.

SECRETARY'S REPORT.

I beg to report that the Local Board of Health, township of Proton, since our meeting for organization, and detailing our members to the several divisions for sanitary purposes, have not been called upon to act in any urgent case of sickness this year. We had our medical inspector, Dr. Jas. McWilliams, to inspect two schools in which it was reported that contagious disease affected some of the pupils. Only two pupils were found to be so affected, and they were excluded until healed. No other occurrence of disease requiring our active interference has developed in the present year. I am happy to state that the general health of our people has been unusually good.

JAS. CAVANAGH,
Secretary.

PLYMPTON.

SECRETARY'S REPORT.

I have to report to you that there has been no epidemic reported by the medical health officer to the Board. The township has been free from all disease, and the only complaint of any kind was of a bad smell from a cheese factory, the proprietor of which at once abated the nuisance on the order of the medical officer.

T. R. K. SCOTT,
Secretary.

RYDE.

SECRETARY'S REPORT.

I have the honor to report that during the present year this township has been remarkably free from contagious diseases, not a single case having been reported, consequently the Board, who were duly appointed, have not been called upon to meet.

W. TINGEY,
Secretary.

RADCLIFFE AND RAGLAN.**SECRETARY'S REPORT.**

Early in the spring there were a few cases of measles of a mild type, with this exception the municipality has been free from contagious and infectious diseases.

There has been a marked improvement in the health of the village of Combermere since the Madawaska Lumber & Driving Co. have lowered their dam at the head of the Palmer Rapids on the Madawaska River. The dam was lowered last winter.

J. E. H. MILLER,
Secretary.

REACH.**SECRETARY'S REPORT.**

I have much pleasure in being able to report the continued healthy state of the municipality, there having been only one case of diphtheria reported to me during the year. It was not necessary to call the Board of Health together during the year. The sanitary measures introduced by the Board at its organization, and the willing co-operation of the inhabitants generally to comply with the instruction of the Board, have no doubt been the great factor in producing the above result.

WM. SPENCE,
Secretary.

RALEIGH.**SECRETARY'S REPORT.**

The reports of the medical health officer shew the sanitary condition of the municipality to be in a satisfactory state. But I would direct your attention to the small percentage of successful vaccinations as shewn by the health officer's report. The total number vaccinated was 558, out of which only 75 was successful, I cannot say what vaccine was used, it having been supplied by the officer, but as none of those operated on shewed marks of previous successful vaccination this seems unsatisfactory. The total cost to the municipality \$116.60, or \$1.55 for each child successfully vaccinated.

Three meetings of the Board have been held since last report, but no complaints as to nuisances or other matters have this year been made.

No reports have been made to the Board by medical practitioners regarding contagious diseases.

J. G. STEWART,
Secretary.

RYERSON.**SECRETARY'S REPORT.**

I have pleasure in reporting that the Local Board of Health, although ready to enforce the requirements of the Health Act when needed, has not been called upon to do so this year, with the exception of ordering the burying of one carcass. There have been no cases of infectious or contagious diseases so far as is known to the Board. In fact,

the sum and substance of our annual reports since the Local Board was formed here (in 1884) have been that the health of the township has been exceptionally good. The Board has held two meetings this year and reports that the township generally is in a good sanitary condition. There have been only two deaths during the year out of a population of about 700, and these were not caused by any contagious or infectious diseases. Take it all through this is one of the healthiest localities in Ontario.

EDWARD GEDDES,
Secretary.

ROCHESTER.

CHAIRMAN'S REPORT.

The Local Board has not experienced the least trouble in carrying out the provisions of the Public Health Act, as the residents of this township have at all times shown a cordial disposition to carry out whatever orders and suggestions the Board was called upon to make. The sanitary condition of the township is good, also the health of the inhabitants is in a very good condition notwithstanding the unusual scarcity of water throughout the whole township.

Diphtheria has broken out two or three times, but owing to the manner in which the cases were watched and the houses placarded and so kept by our Medical Health Officer, the disease was strictly confined to one or two houses at each time. There were two deaths.

The Board at present is in good working order and is using its best efforts in the cause of public health.

PETER COTTER,
Chairman.

RAINHAM.

MEDICAL HEALTH OFFICER'S REPORT.

We are happy to be able to state that nothing of special interest has come under our observation. No diseases of an epidemic character have prevailed save two cases of diphtheria, one of which proved fatal. By care and prompt enforcement of sanitary measures we were enabled to confine the disease to one family. Unfortunately a rumor was circulated that a case of smallpox was in our township, but upon enquiry said report was found to be untrue. Nevertheless, we were called upon by the Provincial Board of Health to see that immediate steps were taken to enforce vaccination, but regret to report that a small percentage of the inhabitants complied with the requirements of the Act. I might here suggest, that in my opinion based upon observation, that all compulsory vaccination should be performed free to the parties vaccinated, the council of the township assuming all responsibility for the same, thus leaving the inhabitants no plea for non-compliance.

J. FRY, M.D.,
Medical Health Officer.

RICHMOND.

SECRETARY'S REPORT.

In presenting this my annual report of the work of the Board of Health for this municipality for the current year I have very great pleasure in stating that in consequence of the almost entire absence of contagion and the general healthy state of the township the duties of the Board were rendered comparatively light. The Board held

three meetings during the year. At a meeting in April the usual notices were ordered to be posted up throughout the principal villages of the municipality calling attention to the cleaning of premises and the removal of all garbage or other deposits endangering the public health, which, under the supervision of the Board, were well observed and thoroughly carried into effect and the township placed in a satisfactory sanitary condition. There were four isolated cases of diphtheria during the year, one of which proved fatal, but the Board was not called upon for any assistance as the relatives took every precaution to prevent it from spreading, in which they were successful. There were no reports as to the violation of the Act during the year, which is very gratifying. We do not claim that the happy state of affairs is directly attributable to the labors of this Board but rather to the good sense of the people who read of the doctrines and philosophy of the laws of health. We commend those in authority for their endeavor to keep before the minds of the people the close connection that exists between people's health, care and cleanliness.

ABRAM WINTERS,
Secretary.

SCOTT.

MEDICAL HEALTH OFFICER'S REPORT.

There were several cases of scarlet fever in June and also in October ; none were fatal to my knowledge. There were also several cases of typhoid fever in August, September and October ; one was fatal. One case was imported from Toronto, so the cause was not chargeable to the sanitary condition of this district. A few cases of diphtheria were found in different parts ; none were fatal to my knowledge. Also a few cases of malarial fever were found but none fatal. Houses were placarded and proper precautions taken to stop the spread of disease in all cases.

The Board of Health is a standing organization in this township and its members are all anxious to promote the sanitary condition of the district in every way.

W. ARMSTRONG, M.D.,
Medical Health Officer.

STAMFORD.

MEDICAL HEALTH OFFICER'S REPORT.

A very healthy season has been the general sentiment of the fraternity. Nevertheless, there have been a few exceptions.

During the winter and spring an epidemic of whooping-cough prevailed, from which few escaped, with two or three deaths of very young infants.

That of whooping-cough was followed closely by an epidemic of measles, similarly sweeping in its course, generally severe while it lasted, but no fatal cases occurred. It was usually accompanied with a great deal of bronchial trouble and delirium.

Scarlet fever broke out in one house ; there were three cases, all of which recovered. As the family was quarantined it has so far spread to no others.

I notified the inspector to examine the cow-byres, which he has done.

I also requested him to require the different school sections to have the water-closets in connection with each emptied during the summer holidays, which he said he did.

JOHN M. DEE, M.D.,
Medical Health Officer.

SYDENHAM.

MEDICAL HEALTH OFFICER'S REPORT.

In making out my report for the present year I have much pleasure in stating that although our township has been visited by a number of epidemics, yet the death-rate from them has been remarkably low.

During the former part of the year an epidemic known as German measles broke out amongst us and seemed to spread rapidly, but, being of a mild type, little effort was made to check it, and few even applied for medical advice. As far as known to me no deaths occurred from it. At present I know of no cases in the neighborhood. This epidemic was traceable to Owen Sound as well as another which came about the same time and known as cynanchi parotidie, or mumps.

It, too, seemed of a mild type, yet there was one peculiarity about it, and that was a strong tendency to leave the neck and pass down to the testicle in the male; still I know of no serious consequence remaining.

The next we had to contend with was a case of diphtheria. It, too, originated in Owen Sound. The house was strictly isolated and every precaution used to prevent its spreading. It proved very stubborn, but after a time yielded to treatment. The patient recovered and no fresh cases followed.

During the hot summer season there were quite a number of cases of diarrhoea. All, so far as known, recovered, with the exception of two cases.

At present I know of no epidemic in the township nor anything requiring the attention of this Board.

A. C. SLOANE, M.D.,
Medical Health Officer.

SHERBROOKE.

SECRETARY'S REPORT.

I beg leave to state that the sanitary condition of the township has been good and the general health of the people unexceptional. There have been no contagious diseases. Only three deaths recorded so far—one of old age, one of heart disease, and one of meningitis.

WM. CHALMERS,
Secretary.

SENECA.

MEDICAL HEALTH OFFICER'S REPORT.

In submitting my report as medical health officer for the township of Seneca I have the honor to say that the condition of the township for the past year has been fairly satisfactory. There are a few of the ale and milk premises in Indiana that might be cleaner, but they are more eyesores than causes of disease. The health of the township has been good and the death-rate low. There have been no epidemics of any kind, nor has there been any cases of contagious or infectious diseases reported.

ROBT. H. DAVIS,
Medical Health Officer.

SALTFLEET.

MEDICAL HEALTH OFFICER'S REPORT.

The township during the past year has been free from epidemics of a serious nature. A few isolated cases of diphtheria, typhoid and scarlet fever have occurred, but they were promptly attended to and measures taken to prevent the spread of the said diseases, which measures fortunately proved successful, and the diseases were confined to their original starting points.

Neglect has been shown in promptly reporting cases of contagion and much improvement is required in this respect.

It is desirable that more complete measures should be adopted to secure general vaccination of the pupils attending public schools. A more thorough system of sanitary inspection of the schools should be made and a more general and prompt report of all contagious diseases to the Board should be made.

Measures have been adopted during the past year to correct unsanitary conditions as they have been brought to our notice.

During the past year several nuisances have existed in the municipality, but they were promptly removed.

At present the sanitary condition of the township is good.

A. C. JONES, M.D.,

Medical Health Officer.

SCUGOG.

SECRETARY'S REPORT.

I have much pleasure in reporting a very healthy year in the township of Scugog. There has not been a case of sickness of any kind reported during the year, and I am not aware of there having been a single case of contagious or infectious disease in the township during the period mentioned.

JOHN FOY,

Secretary.

SULLIVAN.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting my annual report, it gives me pleasure to state that the sanitary condition of the township of Sullivan has been exceptionally good, its water supply and drainage helping materially to this end. During the early part of the year an epidemic of measles occurred; but no cases of diphtheria, scarlet fever, or typhoid have been reported to our board during the year. The death-rate has been very low. The different school-houses and privies in connection therewith, throughout the township received attention during the summer vacation, thus tending materially to the health and comfort of the pupils in attendance. A few cases of nuisances were reported, but they were of a trivial nature. The efforts of the board seem to be appreciated by the public.

GEORGE J. DICKISON, M.D.,

Medical Health Officer.

SOUTHWOLD.

SECRETARY'S REPORT.

Ad I
by

I regret that my annual report is not as favorable as that of last year. No you are well aware of the smallpox epidemic which prevailed to a certain extent Southwold during the months of February, March, and the forepart of April last, which was at first pronounced by the local physicians chicken-pox. Hence, it gained a strong footing before the Board of Health were in a position to take action; but when the disease was pronounced smallpox by outside physicians, the Board of Health went to work with a will and confined it to the families in which it then existed, twelve in all. Forty-three cases were reported, with thirteen deaths. Section 15, of the Act respecting vaccination was proclaimed in force by the Reeve, and J. H. Howell, M.D., was employed to vaccinate in all the school sections on given days, besides other local physicians vaccinating many people. From the best information that I can obtain, there are but very few persons in this municipality who have not been vaccinated. This had much to do with checking the disease. Dr. J. H. Howell was appointed medical health officer, which duty he faithfully performed during the epidemic. All churches and schools were closed for three months, and all public gatherings strictly forbidden; and every precaution the board could think of was taken to check the spread of the disease, such as a strict quarantine of the families afflicted.

I have also to report that there were a large number of cases of malaria in this municipality during the months of August and September, in many instances very severe; but no deaths occurred from it and now it has disappeared. The cause of so much malaria was assigned to the heavy falls of rain in the month of June last, which caused the wells to fill up with surface water, and to the dry season following. Sanitary work was attended to by the Board, such as inspection of slaughter-houses, cheese factories, pig pens, school premises, and school-houses. There were no complaints made to the Board during the present year of any existing nuisances. There was one thing fully demonstrated here during the smallpox epidemic and that was, that it requires men of pluck and courage for members of a Board of Health during epidemics such as smallpox. There were only threemembers of the Southwold Board of Health that came to the front and did their duty like soldiers. Two members of said Board failed to put in an appearance during the whole time, absenting themselves from duty, and at the first meeting of the municipal council they were promptly dismissed and two appointed in their stead as members of said Board of Health. There were no cases of typhoid, diphtheria, or scarlet fever reported to the Board in this municipality during the present year.

M. CAMPBELL,
Secretary.

SANDWICH, EAST.

MEDICAL HEALTH OFFICER'S REPORT.

I beg leave to make my report to you personally as I have an important matter to draw your attention to. In obedience to the statute with regard to isolating of contagious diseases, our efficient clerk, Mr. John Deyal, notified all medical men practising in the township, that houses in which any of the contagious diseases existed must be placarded and the family isolated as far as possible from the general public. Some physicians acted according to the law, others did not, although notified, as well as having a copy of the Act sent to them, warning them of the penalty attached to an infringement of the law. In my opinion, the Provincial Board should act in the matter and notify and warn in an especial manner all medical men of the law in such cases. If the law had been observed there would have been fewer cases of diphtheria in the township.

Pardon my taking the liberty of referring the matter directly to you. I do it in the interests of the public health.

H. R. CASGRAIN, M.D.,
Medical Health Officer.

SAUGEEN.

MEDICAL HEALTH OFFICER'S REPORT.

The public health of this township during the past year has been exceptionally good, no cases of contagious or infectious diseases having come to my knowledge, so that the Board of Health organized and ready for duty have had but little to do. No case of nuisance has had to be dealt with.

CHAS. SHUPE,
Medical Health Officer.

ST. JOSEPH.

MEDICAL HEALTH OFFICER'S REPORT.

This township is free from epidemic disease just now ; but during the year we had an outbreak of diphtheria. In April there were four cases at Cole's, of which two died. Two children of William McNabb took diphtheria on 12th of April, and both got well. May 28th, a child of Archy Wilson's took diphtheria and died. Between July 27th and August 9th, six of Joseph Smedley's family took sick with diphtheria, and three of them died, one aged six years, one four, and the other two. These premises were all fumigated, and I am happy to state that there does not seem to be any fear of further danger.

H. M. ROSS,
Medical Health Officer.

STEPHEN.

SECRETARY'S REPORT.

I would reply that our municipality up to the present has been comparatively free from any contagious disease, the only case was one of typhoid fever in the village of Crediton. That was supposed to be owing to an outlet of the main drain running through the village at that particular place. Attention was at once called to the Crediton affair, the Board met and discussed the matter. A deputation was appointed to investigate and take such steps as might appear necessary. The nuisance was removed and health restored. This, I believe, was the only case of contagious disease during the year. The officers of the Board are very attentive to their duties, in fact, the whole Board is much interested in the carrying out of sanitary measures much more so than formerly.

C. PROUTY,
Secretary.

TUCKERSMITH.

MEDICAL HEALTH OFFICER'S REPORT.

The general sanitary condition of the municipality throughout the year, I consider has been good. In the early part of the year, I was advised of two cases of typhoid fever having appeared in the municipality ; this information I received through the Local Board of Health, thereby showing the interest taken by said Board.

A meeting of the Board was called with a view of investigating the matter; and I am of opinion that the information obtained at said meeting, particularly that given by the attending physician is evidence of impure drinking water being the cause of the trouble. One of the cases recovered the other died. The family was isolated, etc., and no other case appeared.

Later in the year I was asked to visit one of the schools (No. 8), in which it was reported that some of the pupils had measles. I did so, and found only one case of what is commonly known as German measles. Some five or six other cases, I understand, had occurred in the vicinity, all of which recovered.

Still later in the year diphtheria was reported to be in the school No. 9. I visited said school, but owing to the pupils hearing of my coming only a few children were in attendance. I found no diphtheria; but previous to my coming home visited two persons in the neighborhood who were supposed to have it. I carefully examined the cases and though I have known physicians to pronounce similar cases diphtheria, I am of the opinion they would properly be called *follicular pharyngitis*. The four or five cases that occurred all recovered. The school was closed for a week and underwent a thorough cleaning, which I considered advantageous under any circumstances.

I am pleased to be able to say that a much greater interest has been manifested by the people themselves in carrying out the provisions of the Health Act.

J. G. SCOTT, M.D.,
Medical Health Officer.

TORONTO.

SECRETARY'S REPORT.

The work of the Board this year was very light, the township has been in a fair sanitary condition. Two or three cases of diphtheria and typhoid; but I have not heard of any deaths caused by them. Otherwise the general health of the township has been good.

J. EAKINS,
Secretary.

TURNBERRY.

MEDICAL HEALTH OFFICER'S REPORT.

The sanitary condition of the township is good, and the general health during the year has been very satisfactory. Within the past twelve months I have received no notice of any cases of infectious or contagious diseases; and I only know of one or two sporadic cases of typhoid occurring in the township. For several years there has been an epidemic of scabies, affecting hundreds of persons; but I am satisfied that there are now very few cases of this disease to be found. No complaints have been made to me by any of the medical practitioners of the township, or others—in reference to any subject relating to the public health. There has been very material improvement in the general sanitation of the township, especially in regard to the mill dams between the municipalities of Wingham and Turnberry. This, with the low rate of mortality, and the general good health ought to be a cause of thankfulness.

W. B. FOWLER, M.D.,
Medical Health Officer.

 THOROLD.

MEDICAL HEALTH OFFICER'S REPORT.

This municipality, over which I have the honor to hold jurisdiction as medical been made by Mr. Wilson, the Reeve and myself as sanitary inspectors, and in all cases health officer, has been remarkably free from any epidemic or contagious disease. The usual necessary visits of inspection to such institutions as require our attention have where we found reform necessary our suggestions have been promptly and properly complied with.

H. PARK, M.D.,
Medical Health Officer.

USBORNE.

MEDICAL HEALTH OFFICER'S REPORT.

It gives me great pleasure, in presenting my annual report, to state that the health of the township has, for the past year, been exceptionally good. We have been almost exempt from those infectious and contagious diseases of a virulent character. Diphtheria has been conspicuous by its total absence.

Scarlet fever made its appearance in one family in the Woodham section. I had the house and inmates isolated, and every precaution taken to prevent its spread. The children not affected were sent to a house where there were no other children and proper care taken. Four members of the family, including the mother, suffered from an attack; all recovered. They were kept at home for six weeks after all fever had left. All clothing was thoroughly washed and disinfected, and the house was thoroughly washed and fumigated. By prompt attention this dangerous disease was confined to one family.

In connection with this case I might mention a similar outbreak of this disease which occurred in McEntyre's section, township of Blanchard. The presence of the disease was not reported until some seven or eight families were affected. When we became aware of the outbreak we held a meeting; the result was we isolated all the dwellings affected and had the school closed for such time as might be considered safe against a re-outbreak of the fever. The measures we here adopted proved effectual, as no further spread of it took place. This outbreak might have been confined to fewer, possibly one family, had the health officer been notified of the first outbreak. Fortunately such negligence was followed by no loss of life.

Rothebu, or German measles, made its appearance during the summer. It is not so contagious as measles proper, nor yet so dangerous.

Whooping-cough was somewhat prevalent in part of the township. This is called a children's disease, and by too many looked upon as a very innocent trouble. The result of this mistaken idea was three deaths. Only a children's disease, the mother says, as the affected children ask if they may go to the picnic, and as the day is fine she consents. Another mother, because the day is propitious, takes her angel babe of three or four weeks to the soiree also, and coming in contact with the children's disease the poor mother very soon sorrows over the fact that her babe is now an angel. Children with whooping-cough should be isolated from all others until they have perfectly recovered.

Typhoid fever entered at least four families in the municipality this year. There were four cases and one death. One case was imported from Muskoka; one occurred in a house whose drain had its terminus in a frog pond which had been for some time dry. The origin of the other two I did not learn. It gives me pleasure to notice that the secretary notified the trustees to attend to the sanitary condition of the school houses. The sanitary inspector visited the Woodham Hotel, which has an unhealthy hole under part of it. He ordered it to be drained. He also visited a slaughter house whose unhealthy odor has been the cause of numerous complaints during the summer. We

hope his visit may result in putting an end to the nuisance. I would recommend that our Board follow the Health Act, and allow no slaughter house without the owner first obtaining a permit from the Board. Cheese factories and dairies should also be supervised by the Board. Again I would direct the attention of our Board to the unarmed state we are in should we have to contend against an invasion of smallpox, and I would urge that previous recommendations regarding vaccination be carried out.

If we had four meetings in the year in various parts of the township, and collect such information in these quarters as would enable us to form an estimate of the sanitary condition of these localities, we would thus stir up an interest in the community which would greatly tend to promote the better health and sanitary condition of our township.

W. IRVING, M.D.,
Medical Health Officer.

VESPRA.

SECRETARY'S REPORT.

I have much pleasure in reporting that the general health of the township has been good. There have been three cases of typhoid and one of scarlet fever reported, none of them fatal. By prompt precautions being taken the spread of the disease in each case was prevented.

Through the action of the sanitary officer several nuisances, which in all probability would have caused disease and death, have been abated.

A case of typhoid has just been reported by Dr. Allen, which he believes to have its origin in a pool of stagnant water in the neighborhood. The sanitary officer was at once directed by the Board of Health to take steps to have the nuisance removed.

GEO. SNEATH,
Secretary.

WATT.

SECRETARY'S REPORT.

I have great pleasure in stating that the duties of the Local Board have been very light. The health of the township during the past year has been good, no cases of infectious diseases having been reported to the Board.

HENRY W. GILL,
Secretary.

WAWANOSH, WEST.

MEDICAL HEALTH OFFICER'S REPORT.

In handing in my report of this township there is nothing of any kind worthy of special mention, no complaints having been made during the year. An epidemic of diphtheria in the village of Auburn, and a few cases in township outside of village, in all twenty-nine cases, with two deaths, occurred in January. Besides this no other contagious diseases have been reported. The year has been one with very little sickness.

D. M. GORDON, M.D.,
Medical Health Officer.

WILLOUGHBY.

CHAIRMAN'S REPORT.

We are much pleased to report that the sanitary condition of the township has been very satisfactory during the past year. There have been no contagious diseases brought to our notice. The healthy condition of the township has made our labors very light.

Our Board of Health, however, were asked for and strongly recommended by the medical health officer, to procure placards to put on houses where contagious diseases exist, and instructed the secretary to have the above cards printed.

GEORGE WEAVER,
Chairman.

WAWANOSH, EAST.

MEDICAL HEALTH OFFICER'S REPORT.

In conformity with the Health Act, I have to state that the condition of the public health within the municipality has been fairly up to the average during the past year.

In the southern part of the township there were a number of cases of diphtheria in the early part of the year, fortunately of a mild character.

We have had rather more than the usual number of cases of sporadic dysentery, which have generally been amenable to treatment.

The Board of Health is properly organized, but no complaints have been made to it during the year, and no necessity has arisen for its active interference, which certainly should be matters of thankfulness to all concerned.

WM. SLOAN, M.D.,
Medical Health Officer.

WALLACE.

MEDICAL HEALTH OFFICER'S REPORT.

The general health of the inhabitants of the district under my care has, on the whole, been good, one thing particularly noticeable being the absence, so far as my knowledge goes, of the ordinary amount of summer diarrhoea, and in consequence mortality amongst children was very light.

About half a dozen of isolated cases of diphtheria were reported, there being only one case in each house affected. The ordinary isolation and disinfection were practised and the premises placarded without the opposition formerly manifested.

There have not been any cases of any other infectious or contagious diseases reported officially, nor have there been any, to my knowledge, except a few light cases of whooping-cough, terminating favorably.

I have pleasure in again being able to report the absence of public nuisances of any kind.

Vaccination has not been performed as a public protection. I would again urge on our Board the advisability of a general vaccination of all children of school age who do not show the unmistakable marks of a previous successful vaccination. Many children have gone through the operation, but so far as being any protection from smallpox it is merely useless, at the same time the child is exposed to the danger of having some skin disease communicated by the use of vaccine from unhealthy children.

A few cases of malarial fever are generally supposed to exist through the township, owing to the lack of as complete a system of drainage as is desirable, but I am pleased to be able to report a decided improvement in drainage during the last year.

J. STANDISH, M.D.,
Medical Health Officer.

WILLOUGHBY.

MEDICAL HEALTH OFFICER'S REPORT.

In submitting my annual report I am pleased to say that the township is in a comparatively good sanitary condition. Although there have been a number of cases of diphtheria and typhoid fever, yet, considering the prevalence of those diseases in neighboring townships, I think we may consider ourselves very fortunate. The cases of which I have spoken were not of a very virulent type, all ending in recovery. I have noticed a few places in which water stands during a great portion of the summer, and have urged the parties, on whose farms such places were found, to fill up, or more properly drain them, to which they assented. When those places are properly attended to, I will consider our township, comparable to, if not better, than any other in the Niagara peninsula from a sanitary standpoint.

M. L. COLLVER, M.D.,
Medical Health Officer.

WHITBY, EAST.

SECRETARY'S REPORT.

This township is noted for its healthy climate ; the southern part being tempered by the balmy breezes off Lake Ontario, and the northern part lying as it does on the height of land between Lake Ontario and the Northern lakes, is abundantly supplied with an almost mountain air which makes the climate an invigorating one.

During the earlier part of the year we had the usual number of isolated cases of contagious diseases, which the Board did not deem it necessary to interfere with ; but during the month of November an epidemic of diphtheria of somewhat serious nature broke out in the village of Cedar Dale. One family lost three children, and other families were stricken down with the disease.

The Board met and took prompt action, appointed a sanitary inspector and gave instructions to cause to be removed all pig-pens to a distance of at least seventy feet from any dwelling—to placard all dwellings where the disease existed and to use other means in his power to prevent the spread of the disease.

The board also recommended that the village school be closed for a period of at least two weeks. This recommendation was complied with by the school board. These measures effectually put a stop to the spread of the disease and it has been stamped out.

WILLIAM PURVIS,
Secretary.

WOOLWICH.

MEDICAL HEALTH OFFICER'S REPORT

By direction of our Board of Health, I have during the past summer visited all the slaughter houses, meat markets, creameries, cheese and glue factories, and also the school in the township, having first issued the usual notice that I would do so. Things generally were in fair condition as regards the thirteen school houses, sanitary matters had received more attention this year than last. In every case the school house itself had been cleaned during vacation. In six outside buildings had received a thorough overhauling, one section having built new and improved water closets, which should be an example to the others. I wrote to the trustees of the other seven, and as far as I can learn matters were at once put right.

As nearly every household sends one or more children to school, and as children drink more water during the six hours they are at school than during the other eighteen, and though the water at their homes may be good, if foul at school the whole community must suffer. I gave therefore particular attention to the wells. Of the thirteen schools, ten had wells, one of these went dry sometimes, and the water was not very good at any time. Another had some dead thing in it, but fortunately there was a very good spring a few yards from the school grounds, and the well was to be cleaned at once. At another the water did not suit the trustees and they were boring a new one. A fourth had a good well of water but no pump, while a fifth though well and pump were all right yet the children drank from pails. The other five were all that could be desired. Of the three schools remaining two had no wells, and one a dry well, water being procured in pails from neighboring wells which might sometimes be a very successful plan for spreading diphtheria or scarlet fever through the school and section.

The health of the township has been very good. A few cases of diphtheria and no deaths. Some typhoid with one death, and two deaths from consumption.

W. J. PASSMORE, M.D.,
Medical Health Officer.

WAINFLEET.

MEDICAL HEALTH OFFICER'S REPORT.

What might have been an epidemic of diphtheria started in the eastern part of the township on the bank of the Welland River, two of the family died of it; at this stage the board of health took charge of the matter, and with the best results, no more deaths occurring, and the disease confined to those already attacked. In another part scarlet fever sprung up being brought from Fort Erie. In this instance also it was stamped out by being confined to those first attacked. The people do not object to have their dwellings placarded as they used to; they look upon it now as necessary and for the public good, and are awaking to the fact that the board of health is a useful institution.

During the summer a young man from this village working in Buffalo was seized with smallpox, before leaving for the pest house he packed up all his clothes in his trunks. After he died word was sent to his friends here to come and get them. By chance it came to be known to the Board that a party had gone for the clothing, by prompt action on the part of the Board the clothes were intercepted and kept out of the country. Thus what would certainly have been a dire calamity in our midst was prevented by the watchfulness of the Board.

During August and September enteric diseases overspread the township, the young and adults all recovered from them, but of those attacked in old age not a few succumbed. There have been no other epidemic or dangerous diseases during the year, and at the present time the township is comparatively healthy.

W. B. HOPKINS, M.D.,
Medical Health Officer.

WESTON.

CHAIRMAN'S REPORT.

I am pleased to state that our village has enjoyed perfect immunity from any form of epidemic disease during the year, and has been in other respects exceptionally healthy.

JOHN BROWN,
Chairman.

WILMOT.

MEDICAL HEALTH OFFICER'S REPORT.

It affords me much pleasure to state that our municipality has been free from any serious epidemic during the current year.

A number of cases of typhoid fever have occurred throughout the township, but scattered. Generally the origin of such isolated cases is difficult to trace. In one family where three cases occurred I fully believe the fever originated in impure water.

Diphtheria has also occurred to a considerable extent in the village of Baden, but it has been of a mild type, and no deaths have been caused by it.

I may call your attention to investigations now going on in Germany and England as to the part played by butcher's meat in causing consumption (tuberculosis). This disease is now absolutely known to be caused by living parasites (baccillii) which destroy the lungs and other tissues by feeding on them. Cows and other lower animals frequently suffer from this disease as well as man, and the flesh of such diseased animals when eaten can, and frequently does, communicate consumption to the human species. Even prolonged exposure to the heat in cooking does not destroy the vitality of such organisms which when eaten gives rise to that dread disease. To what extent practical results will accrue from these facts, belongs to the future.

Again I must protest against the use of privy pits in villages and small towns. The dry earth system should be used in the absence of sewers, also the proximity of out-houses, pig-styes and stables, to drinking wells.

W. R. NICHOLS, M.D.,
Medical Health Officer.

WOLLASTON.

SECRETARY'S REPORT.

There has not been a case of contagious disease reported within the limits of the municipality.

That with the exception of organizing in the spring, the local board of health has had no call to perform any duty whatever.

That to the best of our knowledge and belief the township is in excellent sanitary condition.

A. HERBERT WANE.
Secretary.

WILLIAMSBURG.

MEDICAL HEALTH OFFICER'S REPORT.

In submitting this report to you for the current year I am more than pleased with the effect of the law that was passed by the Legislature of Ontario for the preventing of diseases. The township of Williamsburg was never in a better sanitary condition than it is at present. The malignant contagious diseases are few and far between. I have only to report two cases of typhoid malaria produced and caused by impure drinking water. Zymotic fevers none. The rate of mortality has been very low compared with last year and the year before. The most difficulty has been with factories, especially those making cheese. The factories last season were in an unsanitary condition. This year I notified all proprietors of such factories to take hold of the sanitary law. I visited all the factories in the township of Williamsburg and the result was we had clean work.

J. J. LANE, M.D.,
Medical Health Officer.

WHITCHURCH.

SECRETARY'S REPORT.

We feel grateful to be able to report that the inhabitants of the township of Whitchurch in the county of York, have not been seriously visited with contagious diseases during the present year.

There have of course been isolated cases of diphtheria, scarlet fever and children's diseases, and on enquiry we learned that those in attendance used every precaution to prevent the diseases from spreading.

J. O. LUNDY,
Secretary.

WELLESLEY.

MEDICAL HEALTH OFFICER'S REPORT.

It is again my agreeable privilege to report favorably on the satisfactory operation of the Public Health Act. There have been but few complaints made, and of these few some were of a rather trivial nature; but even these latter go to show that the public are beginning to appreciate the objects for which the law was instituted. The five slaughter houses in the township have all been inspected—some of them more than once—and suggestions as to proper sanitation have in all cases been cheerfully complied with. The rules touching the care of pig-styes, privies and wells are becoming more thoroughly understood; and though there still are—and doubtless will be for some time to come—glaring cases of delinquency, I am pleased to be able to note a marked improvement in this respect over last year. So far as diseases of the kind, coming under the supervision of the Board are concerned, the township has enjoyed a most gratifying immunity during the past twelve months. Typho-malarial fever has to some extent prevailed in parts of the township during the present autumn, but generally of a mild type, and no fatal cases have been reported. The summer passed without giving us anything like the average proportion of summer complaints, and what we have encountered were mild and in no instance fatal. Diphtheria and scarlet fever have been conspicuous by their absence. There are at present a few cases of whooping-cough of a light character, and without complications.

I must not omit to remark on the remarkable beneficial effect on the public health, resulting from the extensive draining operations that have been going on with an accelerated progress during the past few years. I would recommend that more active measures be put in operation to prevent the careless and improper disposal of carrion by hauling it out into the bush and leaving it unburied to decompose in the sun, as is far too commonly the practice. A prosecution or two would have a beneficial effect, I am convinced.

WM. MORTON, M.D..
Medical Health Officer.

WATERLOO.

SANITARY INSPECTOR'S REPORT.

I beg to submit the sanitary report for the year 1889. Also the report of the dairy men and milk venders that received license during the year. The authorities of Galt and Berlin demanded that those supplying these towns with milk should have their premises and cows inspected, and I found little or no complaint against the manner the Board had

adopted for having the work done. I found all the cows in a healthy condition, well cared for and fed almost entirely on farm produce, only in three places were brewers' grains being fed, and then only in small quantities.

From the decrease in the quantities of grains that are being fed since last year, I would judge that it is not considered a profitable feed. There was no still slop feed this year.

The premises and utensils were all clean and well kept.

The manner adopted by the Board for inspecting slaughter houses this year is a decided improvement to the previous system, there having been only one complaint made against the condition of any licensed slaughter house, and that was not well founded.

There were several complaints regarding the condition of the creeks running through Berlin and Waterloo, which were investigated and found just cause for complaint. The town of Berlin has taken the matter in hand and promised to have the nuisance abated as soon as possible.

The township has been almost clear from infectious and contagious diseases. There have only been a few cases of typhoid fever and diphtheria, which were properly looked after.

WM. COWAN,
Sanitary Inspector.

WILBERFORCE.

SECRETARY'S REPORT.

On the whole, the health of this municipality for the past twelve months may be pronounced good. In the spring a number of cases of inflammation of the lungs appeared amongst old and young, a few of the former proving fatal. About the same time measles appeared in one of the schools and spread through that section. Since then and up to this time no contagious diseases have been known here.

There have been several deaths from consumption this Fall.

GEO. STONE,
Secretary.

YORK.

MEDICAL HEALTH OFFICER'S REPORT.

In submitting my annual report upon the health of the township, I have to regret that contagious diseases have been much more prevalent this than last year. The cause for which no doubt, speaking generally, has been due to the bad water supply and carelessness which people manifest in placing their water closets proximate to the wells. In this regard I must emphasize the clause of my last report in which I pointed out the dangers of the privy pit. In several of the cases of typhoid fever which came under my notice I was able to verify the opinion of practitioners generally as to the dangers derivable from this source.

There have been six or eight cases of diphtheria during the year, the causes of which were due to local sanitation.

At this time, the township is tolerably free from contagious diseases. There is just one suggestion I would like to make to the Board this year in reference to slaughter houses.

I do not think there has been sufficient attention paid to the destruction of offal.

The number of slaughter houses is on the increase, and the difficulty of dealing with them is consequently becoming each year greater. Now there are only two satisfactory

ways of dealing with the question of the destruction of offal—cremate or bury. To use it as fodder for hogs has been tried and creates a nuisance in every instance. Used as a manure its effects are if possible worse than feeding. We are becoming quite an important township, our geographical position secures us the distinction of being the premier township of the province, let us show by our intelligence and civilization we are worthy of the distinction. We cannot convince ourselves, let alone others of this, while we allow the offensive emanations from slaughter houses to pollute the air all along our chief thoroughfares.

H. E. WEBSTER, M.D.

Medical Health Officer.

YARMOUTH.

SECRETARY'S REPORT.

On the 23rd of February, several cases of smallpox were reported in the adjoining township of Southwold, and the Board put in force the regulations necessary to prevent the introduction of the disease into the township of Yarmouth. Medical men were appointed to vaccinate at all the school houses in the township, and guards were stationed at the principal roads. Three families were quarantined until the Board had time to investigate their case, they having come past the guards from the infected district. On the 25th March the guards were taken off, the Southwold Board having full control of the disease. The cost of enforcing smallpox regulations and vaccinating was four hundred and ninety-one dollars.

Several minor complaints were investigated.

The sanitary condition of the township at present is first class.

K. W. McKAY,

Secretary.

CHAFFEY.

MEDICAL HEALTH OFFICER'S REPORT.

At the present time there is no disease of an epidemic or contagious character existing in the township, and good health prevails generally. In April last, in the centre of the township scarlet fever broke out, being imported by a returned member of a family. The cases in this family being mild no physician was called in. The disease was believed to be scarlatina, which many in this section ignorantly consider not to be true scarlet fever. No preventative measures were taken to combat the spread of the disease. A few days later the disease broke out in a malignant form in a neighboring family, with the result of four deaths, besides one member of the family blinded in one eye for life. At the request of our Board I three times visited the stricken neighborhood and took the most vigorous, and what proved to be the most successful, measures to prevent the spread of the disease, viz.: isolation, disinfection, etc. The school was closed for two weeks and the houses of seven exposed families fumigated with sulphurous and chlorine gases, a work carried out under my personal supervision. No other cases of infectious disease occurred during the year. As the railroad runs through the heart of the township with stations on its northern and southern boundaries, the possibility of the spread of contagious or infectious diseases is more to be feared than in remote townships. And here

let me remark that a large proportion of the inhabitants of Chaffey are unprotected against the ravages of smallpox. If the terms of the vaccination act (Revised Stat. Ont., 1887, Chap. 206) were carried out it would not involve an expenditure of more than twenty-five dollars, and all fears of an invasion of smallpox would be dissipated.

F. L. HOWLAND, M. D.,
Medical Health Officer.

CARTWRIGHT.

CHAIRMAN'S REPORT.

I have to state that there were twelve cases of typhoid fever reported to this Board during the year, of which two cases proved fatal.

These cases were chiefly confined to three isolated families and to the small village of Ceserea. The cases were all reported to this Board between the 9th of September and the 21st of October.

Pursuant to a resolution of the Board all the members thereof proceeded to the said village of Ceserea and made a thorough inspection thereof, and in the opinion of the Board the prevalence of the disease was owing to impure water and insufficient drainage from cellars.

The Board ordered that these causes of disease should at once be remedied, and I am happy to report that such orders were promptly complied with, and that no further cases have since been reported.

I am also pleased to report that through the vigilance of the Board of Health, and the efficient services of the local practicing physicians, our municipality is generally healthy, and with the exception of the cases above noticed, free from contagious or infectious diseases.

R. P. PURST,
Chairman.

CLARENDON AND MILLER.

SECRETARY'S REPORT.

In presenting to you the annual report of the local Board of Health of the townships of Clarendon and Miller, it affords me much pleasure to be able to state that the general health of these townships for the past year has been good, with the exception of a few cases of infantile affections. There have been no other cases of a serious nature that have come to my notice. I believe the municipality to be in good sanitary condition.

E. PLAYFAIR,
Secretary.

CAISTOR.**SECRETARY'S REPORT.**

I am happy to state that the health record of the township for the present year has been quite satisfactory, very little sickness of any kind having occurred during the year. No contagious diseases have visited our locality. One case of typhoid of a mild character was reported to have existed. Under the watchful eye of our sanitary inspector about every nuisance was removed, and all dead carcasses were buried.

Our medical health officer's services have not been required during the year.

H. J. SHARP,
Secretary.

CAMBRIDGE.**SECRETARY'S REPORT.**

The Board held three meetings during the year. The last meeting was held towards the end of October, it being for the purpose of gathering information from the several members of the Board regarding the health and sanitary condition of the municipality.

Each of the members and the Medical Health Officer report that the general health and sanitary condition of this municipality will compare favorably with the more healthy of those throughout the Province.

I am not aware that we have had any contagious diseases except a few cases of measles and diphtheria, with one death in each instance.

O. LAFRANCE,
Secretary.

CHARLOTTENBURGH.**MEDICAL HEALTH OFFICER'S REPORT.**

A regular inspection of all suspicious premises, including cheese factories and slaughter houses, has from time to time been made during the summer to secure a proper observance of the regulations regarding the proper sanitary condition of such premises; and it affords me much pleasure to say that few complaints have been made of failure in those particulars.

The general sanitary condition of the whole municipality for the year has been remarkably good. Only a few isolated cases of diphtheria and one of typhoid fever have occurred—the latter being imported.

The only epidemic prevalent, as far as I am aware, was that of mumps.

The present condition of Health in the township is exceptionally good.

ALEX. FALKNER, M.D.,
Medical Health Officer.

CALEDON.

MEDICAL HEALTH OFFICER'S REPORT.

The current year up to within the past few months has been exceptionally healthy, but about midsummer commenced a period which, for the prevalence of typhoid fever, has not been equalled for years. What would at first seem strange, is the fact that it has been quite as prevalent in the farming community as in our village, and in proportion to the population even more so. We naturally expect such cases to occur where the land is low and wet, drainage bad, ventilation defective, habitations close together, or general uncleanness; but many cases have occurred where the land is high and dry, ventilation good, cleanliness almost perfect, and in farming communities where the dwellings are not close together. In the north-west corner of Caledon and the adjoining portion of Erin township there have been eighteen cases of typhoid fever within a radius of two miles, besides many other cases scattered throughout the township. Also five near Inglewood, four at Credit Forks, two near Oatarac, and no doubt other cases through the township not reported by the attending physicians. In no part of the township, however, has the spread of the disease been so rapid and severe as in the north-west corner above referred to. There is not in the county a more intelligent, cleanly and respectable people; their land being high and dry, the dwellings good and well situated, their barnyards clean and dry, and previous to this time the people themselves very healthy. Nor as far as could be ascertained was the disease imported but occurred sporadically in the first case. Disinfectants were used freely, viz.: carbolic acid, phenyle, calcium, chloride and bromo chloralum. Care was taken to disinfect and bury stools; the sick rooms well ventilated, and members of the family isolated as far as was possible. In spite of all this, however, one after another were stricken down with the disease and it went from house to house. Fortunately, however, all these cases made good recoveries although the average duration of the illness was over three weeks. The above cases occurred in my own practice with the exception of two which were attended by Dr. McKinnon, of Hillsburg, Medical Health Officer for the township of Erin, who met me to confer on the matter. We examined cellars, privies, barnyards and made strict inquiries about the wells, all of which, with one exception, had been recently cleaned. But we found nothing to account for the prevalence of the disease. We finally concluded that it was due to a large but well-wooded swamp about a mile to the south, although the swamp was then just as it had been for years, no part of it having been cleared. We attributed it to the extra drouth of the season and consequent lowness of water in the swamp. This hypothesis, however, did not long hold good for I began to notice that no cases occurred to the south and east of the swamp where, from the prevailing winds being west, the malaria of the swamp would naturally be carried. I then collected samples of drinking water from the above places and from any others where the disease was present, in all twenty-one samples. I carefully tested each sample, using the evaporation and permanganate of potash tests for organic matter, and solution of nitrate of silver for chlorides. I found eleven samples positively unfit for use; five doubtful and five very good. Of the five good samples one was from Credit Forks from a spring much used by the villagers there, and two from dwellings where a single case occurred in each house. In the north-west corner, however, all samples were bad, containing large percentages of organic matter. It will be noticed that in the instances where the water was good only one case occurred in each house, while on the other hand where the water was bad one after another of the family were taken down. It was not that the disease became more contagious, but that the inmates of each house were rendered more susceptible from the use of the impure drinking water. The lesson to be taken from the above facts is that in high, dry land, after a very dry season, look to your wells, more especially if the water becomes very scanty. Have them cleaned and deepened if possible. Avoid scarcity by watering stock from other sources, and if this does not prove sufficient boil all water before using. Of the four cases occurring at Credit Forks, two were due to filth heaps collected from a large boarding house where table refuse of all kinds and excreta were thrown, causing an unbearable stench. One

was due to the immediate proximity of a privy and from sleeping in small, damp, close bedroom. I am quite satisfied that had it not been for the timely visit of our Health Inspector, many other cases of typhoid would have occurred at Credit Forks. The houses are small and each contain besides the family from five to thirty boarders, and large quantities of filth are continually accumulating. I personally notified many of the householders to have the privies cleaned and caused the removal of several hog-pens which were in a filthy condition.

The number of cases of scarlet fever have been few and of a comparative mild form, but several cases of a severe type occurred in one family in the following manner: A child was seized with scarlet fever a few miles from Alton village and I was called to see the little patient. There having been no cases in the neighborhood for over a year I began to make enquiries regarding the cause. I found that a lady from Toronto was visiting there with her child, who she said had recently been suffering with scarlatina, but that the attending physician had told her that after a month there would be no danger of carrying the disease. Now this is just where a mistake often arises, for unless proper disinfection of clothing is made, and free exposure to fresh air, the disease may be retained in the clothing for years. There is no contagion so easily conveyed, nor on the other hand so easily got rid of as scarlet fever. If the clothing be freely exposed to fresh air it will in a short time become absolutely free from contagion, while on the other hand a handkerchief or a small piece of clothing thrown carelessly into a closet, may retain the poison for years, in fact it has been known to be carried by letters or parcels. These cases referred to, however, all recovered, and by strict isolation and disinfection the disease was prevented from spreading. The number of cases of diphtheria have been less than in former years and I presume were of a very mild type, for all of my own cases recovered and I did not receive any notice from other physicians in the municipality of death from this disease.

It will be unnecessary for me to here relate the recent flood disaster at Alton village, it has been so thoroughly ventilated through the public press. I would just say, however, that it is fortunate for us that winter is approaching instead of summer, otherwise the results to the public health might be more appalling than the calamity itself. It is to be hoped that the broken dams may be repaired and filled before spring for the malaria contained in the three or four feet of mud in each pond and scattered in the neighboring swamp is sufficient to produce an epidemic of typhoid or malarial fever, diphtheria and possibly scarlet fever unless the ponds are filled and the rubbish cleared away before spring we may have to ask assistance from the Provincial Board of Health and it behoves us as a Board to be on the alert and see that every possible means is taken to prevent what ought to be a very serious matter. I have suggested to the Relief Committee at Alton that no better use could be made of the money subscribed than to remove as far as possible all rubbish and debris. I thought it would be well on the part of our Board to bring these facts before the public, through the press, that aid may be received from our County Council and from any other possible source to be expended for the aforesaid purpose. At the risk of being considered an alarmist I would say that sickness and death lie in that flooded valley and it is better that if we, as guardians of the public health, should err that the error be made on the side of safety.

JAS. ALGIE, M.D.,
Medical Health Officer.

CAYUGA, NORTH.

SECRETARY'S REPORT.

There have been a few cases of typhoid fever near Caufield during the current year, but none severe and none had a fatal result. The doctor attributed the fever to the use

of bad water. There have also been two cases of a slight nature near Kohler, supposed to have been scarlet fever. The persons attacked have all recovered. In all other respects the sanitary condition of the township during the current year has been very good. There is no illness of any importance in the township now.

JAMES MITCHELL,
Secretary.

CHAFFEY.

SECRETARY'S REPORT.

As Secretary of the Chaffey Board of Health, I have to report that on the 30th of April last I received a notice from Dr. Hart, Huntsville, stating that two children of John Tynan, Four-mile House, Chaffey, had died of malignant scarlet fever. I at once wrote out a large placard and posted it on the house the same night. Returned home and wrote to medical health officer Dr. Howland, who, on receipt of my letter, sent me word that he had telegraphed the Reeve to have a meeting of the Board next day. He himself went at once to the house of Tynan and found on enquiry that members of eight families had visited the house during the sickness. As it was near the public school and most of the families had children attending school he at once ordered the school to be closed for a few days.

At the meeting of the Board we each reported what we had done in the matter and they concurred that we had acted rightly in the affair and further instructed the medical officer to revisit the house of Tynan and take a sufficient supply of chloride of lime for all the families who had visited the place. There were four deaths from the fever in the house of Tynan in all, but I am happy to state that in consequence of the prompt and vigorous action taken in the matter it spread no further. On the 18th of May I received a report from the doctor that, having visited the neighborhood and considering the danger over, he thought I might order the school to be opened the next week, but that I had better keep the placard on Tynan's house one week more and if at the end of that time there were no new cases might remove it. I took the necessary steps in each case and we have had no further trouble in the township.

WILLIAM CLARKE,
Secretary.

COLCHESTER, NORTH.

MEDICAL HEALTH OFFICER'S REPORT

It gives me pleasure to state that no epidemic or serious disease has visited us during the past year. The health of the township has been comparatively good. In this township the farmers have as a rule built their barns too near their dwellings. As the ground is level there is no natural drainage and the soil is more apt to become saturated, giving off miasma which at a greater distance would have no effect. If farmers could be informed of the importance of this and act accordingly, it would save them a great deal of sickness in the future. Part of this township is still in forest but is being rapidly settled, therefore the importance of this suggestion is obvious

If the Provincial Board could arrange so that medical health officers could speak in each school section on the most important subjects pertaining to that particular locality a large amount of practical information could be given which would have a good effect on the sanitary condition of the different townships.

E. PROUSE, M.D.,
Medical Health Officer.

OLARKE.

SECRETARY'S REPORT.

For some years the services of a medical health officer and sanitary inspector have not been found necessary, and none was appointed for this year.

At our first meeting the township was divided into five districts, and one allotted to each member of the Board.

The school houses and premises, slaughter-houses and cheese factory have been visited. The school houses and surroundings, while in some cases are capable of improvement, were generally found to be kept in fairly good condition.

One slaughter-house was reported as being kept in a filthy state, and on complaint being made and notice given its use was discontinued.

No fault could be found with the cheese factory, it was well kept and nothing offensive in connection with it. In one well in the neighborhood the water was found to be unfit for use; it was ordered to be cleaned out, and if the quality of the water was not improved thereby it was to be filled up. Several other wells at the foot of a hill, on the summit of which is a graveyard, have been suspected of being contaminated by the soakage from above, but as no injury to the health of those using the water is as yet apparent, and as the presence of deleterious matter in the water could only be established by an analysis by some competent person, the Board has not taken any action regarding them.

Not a case of contagious disease has been reported by any medical practitioner requiring attention by the Board; and with the exception of some cases of German measles and whooping cough, and two cases of typhoid fever, the township has been entirely free from contagious diseases. In the cases of typhoid one of the patients died and the other recovered, the physician in attendance reporting that proper precautions were taken to prevent the spread of the disease.

There seems to be an increased willingness on the part of the people to carry out any reasonable and inexpensive suggestions for the improvement of the sanitary condition of their premises, but many of them do not know what means to use, or what may be fairly required of them.

Our Board is of the opinion that much good would be done through the distribution by the assessor or in some other way, of a circular containing such practical suggestions as could be cheaply and easily carried out by themselves, in regard to the regular cleaning out of wells, cisterns, cellars and yards, the early removal of manure heaps, the cleaning out, disinfecting and deodorizing of privies, etc.; and we hope that this method may be adopted and carried out by the Board for next year.

ROBERT KNOX,
Secretary.

DOWNIE.

SECRETARY'S REPORT.

We are happy to be able to state that our municipality has been almost, if not entirely, free from epidemics or contagious diseases of any description during the present year, consequently the Local Board of Health has had nothing to attract their attention in that direction. Our Board notified the trustees of the various schools throughout the township to get the wells and water closets in connection with said schools cleaned out on or before the 15th day of July.

We are of the opinion that it is a grave mistake to have cheese factories erected on the banks of our streams and creeks, thus polluting them and thereby creating a nuisance. Last year complaints were lodged with the Board as to the contamination of the river Avon from some source, believed to arise from the sewerage of the city of Stratford being emptied into it, thereby endangering the public health and rendering it unfit to drink by cattle or other animals. Our Board notified the city council to take immediate steps to prevent said sewerage coming into the river, but they took no action. The sewerage of said city is still to a very great extent if not wholly emptied into said river, but as the water was not so low this summer as it was in the past season no complaints were entered.

P. SMITH,
Secretary.

DORCHESTER, NORTH.

SECRETARY'S REPORT.

I have much pleasure in reporting that the township is in the most favorable sanitary condition. Not one case of infectious disease has been reported by any of the physicians following their vocation in this municipality for this year. And the inhabitants are carrying out the law as far as we know to our satisfaction.

D. P. AYLSWORTH,
Secretary.

DARLINGTON.

MEDICAL HEALTH OFFICER'S REPORT.

There has not been more than the usual amount of sickness this year.

A few cases of typhoid fever this fall, all of which are recovering. Most of these cases were contracted outside of this municipality.

Some cases of scarlet fever; but no epidemic of this or any other disease, with the exception of whooping cough which made a general sweep through the northern part of the township this summer and fall.

The sanitary condition is fair, although more attention should be paid to the regular cleaning of wells and proper drainage of yards.

J. C. MITCHELL,
Medical Health Officer.

DURHAM.**MEDICAL HEALTH OFFICER'S REPORT.**

It becomes my duty in compliance with the requirements of the law to submit my annual report concerning the sanitary condition of this municipality, especially the part more immediately under my jurisdiction, during the present year. In doing so it becomes my unpleasant duty to report more sickness during the autumn than usual in the south part of the township, although taking the whole year it has been but a fair average. The extreme scarcity of pure, wholesome water for drinking and other household purposes continues to be probably the most prolific cause of the sickness that has occurred.

Diphtheria was very prevalent again this year in this part of the township, it occurred in the beginning of the year, a large proportion of the cases were of a severe type, but fortunately nearly all the cases terminated favorably.

Dysentery also prevailed to a considerable extent during July, August and first half of September, affecting adults as well as children.

Typhoid fever did not prevail to any great extent during the year.

Measles and scarlatina have prevailed but slightly, if at all, during the year, at least none came under my notice and none have thus been reported to me. We have been exceptionally free from the eruptive diseases during the year.

Malarial fever has been unusually prevalent during the last few months, it was of a very severe type, showing a strong tendency to relapse, usually taking the form of pneumonia and generally affecting both lungs. In fact the majority of the cases that came under my observation seemed to be accompanied by a congested condition of the lungs from the beginning of the attack; some cases proved fatal, but now the amount of sickness is perceptibly decreasing and I trust the epidemic will soon be at an end.

H. MINSHALL, M.D.,
Medical Health Officer.

DUMFRIES, NORTH.**MEDICAL HEALTH OFFICER'S REPORT.**

It affords me great pleasure to report that the health of the township during the past year has been exceptionally good, not a single case of contagious disease having been reported during the entire year. The death-rate has been unusually low and general sickness very light.

The sanitary inspectors, according to instructions, inspected the slaughter houses, cheese factories, and the premises of those supplying milk for the towns and villages, and in every case were well pleased with the way in which these premises were kept.

At an early meeting of the Board a resolution was passed advising the council to pass a by-law authorizing the inspectors to charge a fee of one dollar for each inspection of slaughter houses as well as for each inspection of premises from which milk was supplied for sale. In this way a certain amount of the expense of inspection has been borne by those most directly benefited by the work of the Board.

I have visited only two schools during the year, Roseville and No. 25. These I found fairly satisfactory. The latter has been greatly improved by a new heating apparatus and ventilating shafts. Roseville and other schools would do well to do likewise.

At different times during the year the Board has advised the trustees of the various sections to frequently clean the schools, yards and outbuildings, and to report any unsanitary condition or nuisance to the Board at once. In this way we have endeavored to deepen the interest of trustees and ratepayers generally in their schools and in the health of their children.

The Board has been particularly pleased with the evident desire of the residents of the municipality to comply with the requirements of the law relative to the disposal of all kinds of refuse. So well has the law been observed in this respect that only one case of nuisance has been reported which was on the advice of the sanitary inspector immediately removed.

I may say in closing my report that it has been the desire of our Board to render the most efficient service at the least possible expense.

ADAM THOMSON, M.D.,
Medical Health Officer.

DUNGANNON AND FARADAY.

MEDICAL HEALTH OFFICER'S REPORT.

These townships have been remarkably free from endemic and epidemic diseases the past year. Within six months I have not had a case of diphtheria and I believe typhoid fever is almost altogether unknown. The same may be said of malaria fever.

T. A. BEEMAN, M.D.,
Medical Health Officer.

DUMMER.

MEDICAL HEALTH OFFICER'S REPORT.

In laying before you my annual report for the year, I must apologize for its briefness. The general sanitary condition of the municipality will compare favorably with the more healthy of those throughout the Province, there being, with perhaps one or two exceptions, no locality from which we might reasonably expect poisonous effluvia which might develop, or at least, so contaminate the atmosphere as to favor the spread of contagious diseases. I know of no complaints having been made, and so far as my knowledge of the residents of the municipality goes, I have reason to think they cheerfully wish to comply with the requirements of the Public Health Act.

J. A. COUCH, M.D.
Medical Health Officer.

EASTHOPE, SOUTH.

SECRETARY'S REPORT.

It affords me pleasure to be able to report that the sanitary condition of our township during the current year has been quite satisfactory. From my predecessor in office or the first eight months of this year, I learned that nothing had occurred in that time
7 (R.H.)

which required any special attention of the Board of Health ; and since then, only one case came under my notice, which threatened to become a public nuisance ; but prompt and decided action of the Chairman of the Board prevented it becoming such. Dr. Whiteman, our medical health officer, reports very favorably, and the other medical men in and near this township, of whom I enquired on the subject, state that no contagious or infectious diseases of any kind had come to their notice in South Easthope.

V. STOCK,
Secretary.

EMILY.

MEDICAL HEALTH OFFICER'S REPORT.

I beg to report that the general health of your municipality during the current year has been exceptionally good. In the southern portion of the township we had one severe case of diphtheria ; but with complete isolation and efficient disinfection the disease was confined to the person first attacked, and who, I am happy to say, made a good recovery.

VINCENT C. CORNWALL, M.D.,
Medical Health Officer.

EUPHRASIA.

MEDICAL HEALTH OFFICER'S REPORT.

I am glad to be able to report the absence of any serious outbreak of epidemic diseases during the year, and that the general health of the community has been fairly good.

There has been so far as I am aware no cases of typhoid, a few cases of scarlet fever, and no cases of measles. The most dangerous and most prevalent disease in the township during the year was diphtheria.

On the 13th of February, being notified by the medical man in attendance, my partner, Dr. Ego, in my absence visited the place on the 1st concession of the township. He placarded the house and gave such instructions as were necessary for preventing its spread, and also for cleaning and thoroughly disinfecting the house and premises. In this family, I understand, there were two cases, one death occurring before my visit. Again, on the 27th day of February, being notified that in another house in the same locality it had broken out, my partner visited the house, gave instructions for the isolation of the affected parties, placarded the house and ordered the cleaning and disinfecting of the place, and so far as I am aware no other cases occurred in that locality.

On May 20th I was sent for, to attend a patient on concession 9, and found the party—a school teacher—bad with diphtheria. I immediately ordered the closing of the school and isolation of the patient, sent all the other members of the family to another unoccupied house at a distance, and enjoined quarantine until such time as it was known whether any more cases would break out amongst them. I treated the patient—a very

severe case—until better, and had the house and premises disinfected, and the well cleaned out before any more water was used out of it. In this instance, the infection was clearly drinking foul water contaminated by the drainage of the stable manure which was located within a short distance of the well, and on higher ground with the surface drainage always flowing towards the well. I analyzed the water and found it contained a large percentage of organic matter evidently from the manure heap. I ordered the school to be cleaned out, whitewashed, and disinfected before being used again, and I am pleased to say no other cases occurred there since, except one in a neighboring family that I was notified of the day of my second visit. This family I visited twice, and submitted to the same quarantine regulations as the other, and in neither case did it spread beyond the first house in which it broke out.

On August 6th, I was called to attend a family in the south-eastern part of the township, and found two members suffering from a very malignant type of diphtheria. On making further investigation I found that in the same locality there were three members of another household down with the disease. These latter were ill first, and as there was some communication between this house and the one I was called to, I believe that by this means was the disease carried to the second house. I immediately isolated the infected parties, placarded the premises and gave all the necessary instruction for the proper disinfection of the houses. In these cases I feel sure the disease originated from the members of the first family using drainage water from a low boggy swale.

I was again informed that diphtheria existed in another house in the eastern part of the township; but that they were under the care of a medical man. Therefore, I did not deem it advisable to visit the place, but I wrote him drawing attention to the clause in the Act compelling all medical men as soon as they became aware of a contagious or infectious disease in any patient under their care, to give notice of it to the medical health officer for the locality, or Board of Health.

It is to be regretted that some medical men completely ignore the provisions of the law in that respect, and pay little attention to the usual requirements for the prevention of the spread of disease. Were the necessary provisions strictly carried out, of isolation and disinfection, I am convinced we need not have more than one case when we frequently have a dozen.

I would also respectfully suggest the advisability of our Board of Health getting a large number of sheets published of instructions as a means for preventing the spread of this and other infectious and contagious diseases, so that whenever a case is discovered, the family may be given one of these sheets that it would be constantly available, giving the minutiae of instructions which cannot be given by a medical man sufficiently often to be kept in memory by the parties requiring them, or these might be bought from the Ontario Board of Health by the 100, at a trifling expense.

In all, about 20 cases of diphtheria, a few cases of scarlet fever and measles, with some cases of whooping-cough, were the total that came under my observation in the township during the year. There was also, I am pleased to say, very few diseases of a general character, and the health of the people on the whole might be considered good.

It gives me great pleasure to add in conclusion, that in every instance when necessary, I have had the hearty co-operation and assistance of members of the Board to carry out the provisions of the law, and the necessary requirements for stamping out disease; and while it is unnecessary to make individual distinctions, I cannot but acknowledge with thankfulness the assiduity of the Reeve, Mr. Gilray, in doing everything that was possible to aid me in the discharge of those duties, not only for the eradication of disease, but also for the amelioration of suffering humanity.

T. S. SPROULE, M.D.,
Medical Health Office.

ELMA.

MEDICAL HEALTH OFFICER'S REPORT.

The Township of Elma was visited during the month of August, with an epidemic of typho-malarial fever, and in a few instances of genuine typhoid, none of these cases, however, have proved fatal that I am aware of up to the present juncture. In a former report, I think I gave a topographical description of the township, with the prevalent diseases up to that time. Being one of the flat townships with a luxurious growth of pine, and nearly every kind of wood and having a very loamy soil, we had in former years a great deal of diphtheria and consequent loss of life among the children. This, I observed, was much worse in saw-mill villages where acres of saw-dust remained piled to a depth of several feet, retaining a continual moisture where diphtheritic fungi are invariably propagated.

During the last few years under the new drainage law, a very large area of the township has been thoroughly drained and put in a state of cultivation, and I have noticed a great diminution of diphtheria as a consequence, more especially is this the case where the saw-mills have been torn down and the mounds of saw-dust removed.

The township has several villages included in its area, all unincorporated. One of these contains about 400 inhabitants, and had two slaughter-houses in full operation until we had a few cases of typhoid (previously referred to), when I wrote to the Central Board asking for their removal. One of these has since been taken to the country, and the other which was not in close proximity to any residence and well kept allowed to remain.

In this township are nearly a dozen cheese factories; at several of these, hogs are kept during the warm summer months, and it is needless to say that they are the cause of a great nuisance wherever kept, and I have seen a few cases of typhoid on such premises, or in close proximity thereto. Such nuisances must, in my mind, have a deleterious effect on the cheese manufactured on such premises, and I think, the authorities should give the matter their serious consideration, inasmuch as cheese is an important article of food, much of which we export to other countries; this evil could be easily obviated by legislation, although it might place patrons at a little inconvenience in removing food from the premises to their homes.

In conclusion, I hope the Government in their wisdom will see fit to revise that portion of the Act allowing the Town and Township Councils to appoint their own members a board of health, which, in my mind, should be composed of men thoroughly independent of the suffrages of the people. The Boards of the present day too often perform their duties in a worse than perfunctory way; and to give an example the Board of this township, of which I am medical health officer, has not met, that I know of this year, and I have no doubt the farce is carried on in other townships in a similar manner.

J. R. HAMILTON, M.D.,
Medical Health Officer.

EASTNOR.

MEDICAL HEALTH OFFICER'S REPORT.

It affords me much pleasure to report that our municipality has been entirely free from contagious or infectious diseases during the present year.

The general health of the municipality has been good. I also request the attention of our Board to the disease which has prevailed among the cattle of some sections of this municipality.

JAS. S. FREEBORN, M.D.,
Medical Health Officer.

EGREMONT.**MEDICAL HEALTH OFFICER'S REPORT,**

I am pleased to be able to state that the general sanitary condition of the township is excellent. There has been but few cases of those diseases known as preventable. The only ones coming under my observation were three of typhoid fever, a few cases of simple scarlatina, with one case of diphtheria. In the typhoid cases one was imported. Every precaution was taken as to disinfection, isolation, etc., where necessary. Pertussis has been rather prevalent among the children of some neighborhoods of late, and when attending school; the parents have been advised to keep them at home until the symptoms have abated. Owing to the rolling condition of the land, with a gravelly bottom and abundance of pure spring water, malaria with its attendant evils is unknown.

A. L. BROWN, M.D.,
Medical Health Officer.

ENNISKILLEN.**MEDICAL HEALTH OFFICER'S REPORT.**

No serious illness or fatal epidemics of any kind have been met with. Therefore, the duties of the medical health officer and health inspector have been light. The isolation, and the abundance of room, together with plenty of fresh air must always make the country the healthiest abode of man. At the same time ignorance of sanitary laws, and indifference to the proper construction of house drains and out-houses have been attended with much illness and loss of life. This should not be the case, and if the Board of Health of this township do nothing more than awake an interest in these matters, it will not have existed in vain.

G. D. LOUGHEED, M.D.,
Medical Health Officer.

ESQUESING.**SECRETARY'S REPORT.**

The sanitary inspector reports very favorably of the sanitary condition of the several villages of the municipality, much more attention being now given by the people to the condition of their premises than formerly.

There has been only one case of contagious disease reported during the year, from which there was no spread of the contagion.

The Local Board has ordered the removal of the only slaughter house in the municipality; this was unavoidable owing to numerous complaints, the owner failing to keep it in a proper condition.

There has been, I am informed, quite a few cases of typhoid fever during the year, none of which have been reported to the Board of Health, hence no action by that body. The difficulty, as usual, being with the attending physicians, who will not report the cases of contagious diseases occurring in their practice. Some remedy must be found for this, such as the employment of medical health officers, or other means of enforcing the provisions of the Public Health Act.

J. MURRAY,
Secretary.

EDWARDSBURGH.

SECRETARY'S REPORT.

The Secretary of the Local Board of Health of the township of Edwardsburgh begs leave to report that the sanitary condition of the township has been fairly good, and is at present free from any kind of epidemic or contagious disease.

Early in May the sanitary inspector visited a number of places and caused the burial of dead carcasses and the removal of any thing that might be detrimental to the public health. On inspection he also found some of the school privies to be in a disgraceful condition. The trustees were ordered to have the premises thoroughly cleaned up, which was done forthwith.

GIDEON FAIRBAIRN,
Secretary.

ELDERSLIE.

SECRETARY'S REPORT.

The Secretary of the Board of Health of the township of Elderslie for the year 1889, reports :—That after being duly organized the members of the Board were appointed sanitary inspectors for the township.

School houses and grounds, creameries and a cheese factory were inspected, and found kept in a satisfactory condition. All dead animals were buried. The health of the residents has been such that no notice of any dangerous diseases existing has been received. No nuisances have been reported to the Board.

DR. McKECHNIE,
Secretary.

ERIN.

MEDICAL HEALTH OFFICER'S REPORT.

In compliance with the provisions of the Health Act I beg leave to present my annual report for the year ending November 15th, 1889.

The Board in this municipality has had some work in the fore part of the present year, and we trust that in the future the efforts put forth and the work accomplished may be of such value as to open the eyes of parsimonious and short-sighted economists, to the benefits to be derived from sanitary measures. Taking the year as a whole the health of this municipality has been fairly good. I regret, however, to state that, with two exceptions, not a single report came to me from any physician attending any case of contagious or infectious disease in this municipality, a state of affairs which I trust will, in the near future, be remedied.

In the month of February diphtheria made its appearance in Mimosa, a small village in the western part of this township, in the house of one Mr. John Reid. Mr. Reid states that the medical attendant carefully warned him as to the nature of the disease, and advised as to isolation of patient, disposal of infectious matter, etc., but I am sorry to state that neither Mr. Reid nor the medical attendant gave any notice whatever to any member of the Board, so far as known to me, nor to myself until the disease made such headway that two deaths had occurred, one a child of Mr. Reid's, and the other a child that lived across the street, and who, I am informed, was allowed to visit patient first afflicted during its illness; in fact the health law was so ignored by Mr. Reid, who is a magistrate, that a public funeral was allowed, and worse still the coffin opened at the grave, thereby giving every opportunity for the spread of the disease. On the 27th of said month, I was notified by one of the Board that diphtheria prevailed in said village of Mimosa. I at once visited the village and carefully examined the houses in which

said deaths had occurred and the surrounding premises, also all other houses that were considered suspicious. I found that the house of Mr. Reid (about nine days after death had occurred) was now undergoing a process of disinfection, otherwise the house and surroundings were in as good a sanitary condition as probably could be expected, taking all things into consideration. In fact in all the houses I visited I could not find very much at fault. True, at one place, I found a family living in a house separated from a stable in which were cows and horses by simply a partition or wall of house. After advising proprietor as to what he should do, he kindly acquiesced and carried out, I believe, my instructions. At this time there were two patients in the village afflicted with the disease, so I placarded all the houses in the village in which the deaths had occurred, in which any patients were afflicted, or in which any cases had been that had not been satisfactorily cleansed, or was not, at the time of my visit, being disinfected, and gave instructions as to isolation of patients then ill, and as to disposal of all infectious matter.

On the eighth of the following month I received a card from one of the persons whose house I had placarded, that there were cases of diphtheria in two other houses in the immediate vicinity of Mimosa, and that if I did not at once put a card on said houses I was to at once remove the one I placed on his. On the following day I attempted to visit these houses, but on account of the condition of the roads I could only reach one of them. I found this house in more than a usually good sanitary condition, and upon enquiry I learned that the patient here was allowed to mingle with those who had been afflicted prior to notice being given to Health Board. This house was nearly one mile from the village of Mimosa. I concluded this was a case of direct infection. I placarded the house, gave usual instructions and then wrote to the medical attendant. The next day I visited the other house and here again I found the patient had been with those previously afflicted, and that this one was also a case of direct infection by commingling with those afflicted. I placarded the house, gave the usual instructions, etc. I then was notified that two other families were afflicted. The roads were in such a condition I could not possibly get there with my conveyance, so as soon as the roads were passable I visited the other houses. These again were cases that had been exposed to direct infection by being with others previously afflicted. Placarded houses, gave instructions, etc. The people in the vicinity now became thoroughly aroused and the major portion were anxious to aid us in checking the disease which, I believe, would not have occurred had proper precautions been taken or notice been given to the Health Board or myself at the inception of the disease in Mimosa. If such notice as is imperative by the Health Act were given, at least one life might have been saved and a great amount of suffering and anxiety avoided.

After a careful enquiry as to the cause of the outbreak of diphtheria in Mimosa, I report that, in my opinion, the disease was not caused by the unsanitary condition of the village, but was conveyed here by parties who were exposed to the infection in other places, or in other words the disease was imported. I also report that, in my opinion, the disease spreading as it did was due to the negligence and guilt of those whose duty it was to notify the Health Board.

On April 15, I was notified of a case of scarlet fever in the village of Orton. This small village being partly in two municipalities, and a case of scarlet fever across the street in East Garafraxa, said case having passed through some stages of the disease prior to a physician being called. I believe infection direct was the cause in the second case. I placarded the premises, gave instructions, and no further trouble occurred.

In the month of October some five or six complaints were made to me regarding children attending school from houses in which there were case or cases of typhoid fever. I interviewed the teacher of said school and she at once said that she would attend to the matter and in the future not tolerate any attendance of such children from houses where any infectious or contagious disease existed.

A. H. MACKINNON, M.D.
Medical Health Officer.

ELMA.
SECRETARY'S REPORT.

The general health of the township is and has been very good, very few cases of contagious diseases have been reported to members of the Board, or have been in the township.

The Board has, during the year, caused two slaughter houses to be removed from near any travelled road into the bush.

As in former years the owner or occupants of all cheese factories and slaughter houses were notified in the spring that the factories and houses and surroundings must be all kept as clean and as orderly as the law in that behalf directs.

The increased drainage throughout the township each year is also lessening the cause of disease.

T. FULLARTON,
Secretary.

ERNESTOWN.**CHAIRMAN'S REPORT.**

This township is in a healthy state; there has been only a few cases of contagious diseases during the year, and such precaution was taken by the medical men in attendance as to prevent any deaths or the spreading of the disease beyond the parties afflicted. At the present time the municipality is entirely free from any contagious diseases.

BOWEN E. AYLSWORTH,
Chairman.

FLAMBORO', WEST.**CHAIRMAN'S REPORT.**

At our first meeting the sanitary inspector was instructed to inspect all houses in villages, hotels, factories, school houses and premises, cider mills and apple drying establishments, slaughter houses and dairies. At our second meeting the report of the sanitary inspector was adopted, which report states that the places mentioned above were inspected and with a very few exceptions were found in a good sanitary condition. In the case of the exceptions the parties were ordered to clean up their premises, which order was promptly complied with. Permits were granted to nine persons owning slaughter houses, their premises having been found clean and well kept. The dairies and premises of milkmen in the township have been carefully inspected by the inspector, and the premises found in a clean and satisfactory condition, and the cows, aggregating two hundred and eighty-four, to be well kept, in good condition, and very healthy. There has been comparatively few cases of infectious or contagious diseases during the year. In the spring there were several cases of German measles, none of which ended fatally. The causes of three fatal cases of scarlet fever was attributed to contagion carried from other districts, and not from any unsanitary condition. During the latter part of the summer several cases of typhoid and malarial fever occurred, owing to drying up mill dams, none of which cases, however, were fatal.

THOMAS MORDEN,
Chairman.

FLAMBORO', EAST.**MEDICAL HEALTH OFFICER'S REPORT.**

This year as in the past we have every reason to feel thankful that we have not been visited with any widespread cause of mortality, or sickness in this municipality. We have had very few complaints of nuisances, and where there were any the cause was looked into and speedily remedied. As there were only two that came under my notice I might mention them. That of the slaughter house on the road allowance between the municipalities of Waterdown and East Flamboro', which the joint councils had closed up, and the water supply at school section No. 1 on the Plains road. I examined this water, and after doing so had the trustees close up the well for the remainder of the season and get their supply of water from another source.

It is a matter of congratulation to know that although we have had the various zymotic diseases in our midst during the past year, we have yet to learn of there being any deaths from such.

There has been quite an epidemic of pertussis along the 1st concession during this fall, but as yet without any fatal results.

Some four or five cases of measles came under my notice during the year, all being of a mild form.

There have been some few mild cases during the year of diphtheria.

Scarlet fever existed in two families, and these are the only cases that I have been called to during the year of this disease.

I have been called to twelve cases of typhoid fever during the year, two of which I had removed to Hamilton hospital on account of not being able to get anyone to take care of them. All did well. Four of these cases contracted the disease elsewhere and came into the township with it. I attribute the cause in these cases to the filthy condition of privy vaults, and in some cases to the low condition of the wells during the latter part of the summer and early fall.

J. A. MCGREGOR, M.D.
Medical Health Officer.

FINCH.**CHAIRMAN'S REPORT.**

There were no cases of any dangerous contagious diseases this year in the municipality.

The Board caused the slaughter houses in the village of Berwick to be removed.

There was no medical health officer appointed as the Board was of the opinion that under the circumstances it was not necessary, and that a medical health officer could be appointed when it appeared necessary.

The general sanitary condition of the township is very good.

JOHN M. CAMPBELL,
Chairman.

GLOUCESTER.

SECRETARY'S REPORT.

The local Board of Health for the township of Gloucester, county of Carleton, was duly organized at the beginning of this year, but have not found it necessary to have more than four meetings, as the state of health of the inhabitants generally in the township during the year has been good. No infectious or contagious diseases in the form of an epidemic, with the exception of isolated cases of diphtheria, have been known to exist.

Our medical health officer has been called upon but in three cases.

Our sanitary inspector has during the year spent nineteen days in looking after nuisances of different kinds, and it seems to this Board that the law is wrong with regard to the payment of the sanitary inspector, inasmuch as it provides that his fees for inspecting premises and giving notice that a nuisance exists and calling again to see that it has been abated, should be paid out of the township funds. This Board fails to see why such charges should not be taken out of the pockets of the wrong-doers.

C. BILLINGS.

Secretary.

GOSFIELD, SOUTH.

MEDICAL HEALTH OFFICER'S REPORT.

The present year having been singular in point of immunity from the prevalence of diseases of a nature calling for the interference of our Board or its officers, my report is necessarily brief.

The only matter demanding attention has been the invasion of the neighboring municipality of Pelee island by smallpox. In consequence of this I have, in accordance with our Board's instructions, either in person or by proxy, attended at each school house in the township and vaccinated all those who presented themselves, except those who had been recently successfully vaccinated.

No other matter having called for my attention during the year, I have nothing further to report.

S. A. KING, M.D.,

Medical Health Officer.

GEORGINA.

SECRETARY'S REPORT.

The Board met and organized in the month of February. Various complaints having been made concerning a party living near Udora, in south-east part of the township, that was in the habit, year after year, of loosing old horses and carelessly letting their carcasses lay about in the neighborhood, causing pollution of the atmosphere when warm weather set in, to the great annoyance of the inhabitants of that locality, the secretary was requested to communicate with the party and order him to bury any such animals immediately, and discontinue the practice for the future.

On March 14th the Board met, having received notice from Dr. Noble that several members of the Miers family, in the village of Sutton, were ill from typhoid fever. The medical health officer, with a committee of the Board, were appointed to take immediate steps for their relief. Said committee reported the cleaning of yard, closing up of well found situated in a position that rendered it quite unfit for domestic purposes, disinfectants were freely applied, nurse provided along with other necessities. All of the family, five in number, finally recovered.

The sanitary inspector was ordered to examine all cellars, wells, back yards, etc., within the village of Sutton about the 20th April and see that the Public Health Act was fully complied with. The secretary was requested to notify the butchers that no slaughtering of animals nor rendering of tallow, etc., would be permitted within said village after the 1st of April.

On April 27th a notice was received from Drs. McDermott and Fierheller, of Sunderland, stating that two cases of scarlet fever were in the family of John Wilson. The premises were immediately placarded and other arrangements made for their relief. One case proved fatal, however. I am happy to say that all of the other members recovered.

In the beginning of the month of October a circular letter was received from Drs. McDermott and Fierheller, stating that typhoid fever prevailed at Udora, in a house occupied by a family named Hambly, lately from Leaskdale, in the township of Scott. The chairman and secretary visited said family and found them very ill and in destitute circumstances. Provision was at once made for their maintenance, and an effort made to obtain a nurse; in this, however, we failed. According to information obtained in the neighborhood these parties were originally from the township of Scott, and the husband still employed there when fit to work. Besides, as we are told, the disease was contracted at Leaskdale, and a sister-in-law, who we found in attendance still weak from the effects of same complaint, who was the mother of a young child. The Board agreed to pay for the keep of this child so long as the mother was engaged in nursing the Hambly family. The Board provided for their maintenance, with the exception of about four days, until they were reported convalescent.

Notice was received on the 17th inst. from Dr. Noble, stating that typhoid fever prevailed at Mrs. Doidge's, 5th concession, township of Georgina. Necessary precautions will at once be taken.

With the exception of the foregoing the township of Georgina has been free from any epidemic or contagious diseases. Our medical health officer has upon all occasions been very attentive, and the members of the Board generally, particularly our chairman, who, as usual, has been most energetic in the performance of any duty devolving on him.

ANGUS EGO,
Secretary.

GWILLIMBURY, EAST.

SECRETARY'S REPORT.

A sub-committee of the Board was appointed to keep an oversight of the slaughter houses in the township, being vested with authority to take such action as they might deem necessary for the protection of the public health.

Quite a number of cases of public nuisances occurred during the year, which were promptly and efficiently dealt with by individual members of the Board.

In accord with our usual practice the secretary sent out circulars to the various physicians practicing in the municipality, asking for a detailed report of the infectious diseases treated by them during the year, from which they compile the following statement, viz.:

| | No. of Cases. | Recovery. | Deaths. |
|---------------------|---------------|-----------|---------|
| Scarlatina | 5 | 5 | .. |
| Scarlet fever | 3 | 3 | .. |
| Diphtheria | 12 | 11 | 1 |

The Board have much pleasure in reporting the general health of the community at present as most satisfactory.

A. J. HUGHES,
Secretary.

GRIMSBY, SOUTH.
MEDICAL HEALTH OFFICER'S REPORT.

There have been five cases of scarlatina in the municipality during the year. Source of infection unknown. Probably some clothing long laid away. One of these cases was puerperal, and as is usual proved fatal. The disease did not extend to anyone outside the family.

We would recommend as we did last year, and as is probably we may do next year, that it is the duty of the attending physician in rural districts to placard houses where there are infectious diseases, and that he be supplied with placards, as he is now with blanks for reporting contagious diseases.

D. McMURCHIE, M.D.
Medical Health Officer.

GREY,**SECRETARY'S REPORT.**

In submitting to you my annual report for this township, it affords me great pleasure to be able to state that we have again been blessed with another healthy year. With the exception of a few cases of dysentery and measles, we have been free from contagious or infectious diseases, and I believe the township at the present time to be in an excellent sanitary condition.

WILLIAM SPENCE,
Secretary.

GLENELG.**SECRETARY'S REPORT.**

I have the honor to report that this municipality is perfectly free from any infectious or contagious diseases, no cases of such having come to the knowledge of the Board with the exception of one case of diphtheria in the early part of the year, which was isolated under the directions of the attending physician, and was confined to one member of the family, and was not very serious.

J. S. BLACK,
Secretary.

GARAFRAXA, WEST.**MEDICAL HEALTH OFFICER'S REPORT.**

Typhoid fever and malarial fever pretty prevalent. There have been no other cases of contagious or infectious diseases during my term of office. The public health with this exception is good on the whole. I would suggest that the attention of the inhabitants be called particularly to the necessity of having their wells thoroughly cleaned and disinfected at least twice a year, and would also have their attention called to matter of

systematic and thorough drainage from cellars, cesspools and water-closets. It should be made compulsory for the latter to be thoroughly cleaned at least four times during the summer and twice during the winter, besides a jar of chloride of lime or some other disinfectant should be kept constantly on hand, and stools sprinkled with the disinfectant frequently.

In every case of typhoid under our care every means has been employed during illness and after recovery to isolate and disinfect patient and all clothing, furniture, etc., exposed to the contagion.

A. H. HOLLIDAY, M.D.,
Medical Health Officer.

GAINSBORO.

SECRETARY'S REPORT.

I beg leave to report that the general health of the township of Gainsboro, has been exceptionally good during the current year. There has been no serious epidemic of any contagious disease; only a few cases of scarlatina in Wellandport, which was prevented from spreading by the medical health officer taking prompt action to isolate cases. The Board has had a few cases of nuisances to deal with, which have been properly attended to. At the present time there is no contagious diseases, or any other serious cases of sickness in the township.

S. KENNEDY,
Secretary.

GODERICH.

CHAIRMAN'S REPORT.

In submitting my annual report I am happy to state that the duties of the Board were not very arduous during the past year.

The school houses, ten in number, are comfortable, kept clean, well ventilated, and a full supply of good drinking water in or convenient to the premises of each. Also necessary out-houses to each. No report of skin disease, smallpox, diphtheria, or any other contagious disease has been made to the Board for the past year. In short the medical practitioner to the Board has not been called to visit any of the schools during the past year, which speaks well for the sanitary condition of the school houses and the health of the children in attendance.

In my previous reports I have stated how that the geographical position of the township, with its lake and river surroundings, and its numerous springs of pure cool water are conducive to the health of its inhabitants. It is one of the most healthy localities in the province, and generally speaking the farm houses and their surroundings are well kept, even the careless and indifferent are being shamed into imitating their careful and progressive neighbors. Not a single complaint has come before the Board this year of ill kept, or filthy premises. No deaths have occurred, nor do any diseases exist except those arising from natural and uncontrollable causes.

JOHN COX,
Chairman.

GLAMORGAN.

SECRETARY'S REPORT.

The township has in the past year been free from disease, and up to date no deaths have been reported. The Board has no medical health officer or sanitary inspector. Each member of the Board having a set district to overlook, and this year the services of none of the members of the Board have called in, except in the case of two aged persons who had temporarily to be provided with necessaries.

STEPHEN KETTLE,
Secretary.

GOSFIELD, NORTH.

SECRETARY'S REPORT.

I have much pleasure in reporting that the health of the people in this township has been during the past year exceptionally good. Malarial and typhoid fever have been almost entirely absent, only four cases having come under the notice of the Board; one fatal, a child of very poor constitution. The people generally have exercised more precaution in keeping their places clean.

By order of the council vaccination has been made general as far as possible. In 1885 nearly eleven hundred were vaccinated, up to the present time nearly three hundred have been, and I fully expect it will nearly reach four hundred. Diphtheria and other contagious diseases have been entirely absent from the township, no case having come to the knowledge of the Board.

ISAAC JACKSON,
Secretary.

GUELPH.

SANITARY INSPECTOR'S REPORT.

During the past year no epidemic has visited the township, and from what I can learn the health of the people has been very good. I have had very few complaints made to me during the past year, but those that have been made were duly investigated by me. On the 29th of December last, complaints were made to me about Mrs. Pinder's cows having some disease of a dangerous nature, and that the milk from those animals was being sold to the people. I at once went and investigated into the matter, and found such was not the case, although Mrs. Pinder had cows which were suffering from some contagious disease, but still she was not selling the milk, and in order to satisfy the people I requested Dr. Grenside to go to Mrs. Pinder's place and make an examination of the condition of the cattle. He reported there was no cause for alarm, as the animals as soon as they were affected by the disease went dry and gave no milk. In order to satisfy her customers Mrs. Pinder purchased milk from other vendors, and having notified the people through the public press of what I had done I think they were well satisfied and have heard no more complaints. On the 3rd of April, I received a letter complaining of a fat rendering establishment on the York road. I went and examined it, but I did not consider that there was anything sufficient to warrant me in ordering Mr. Stull to discontinue his work of rendering. On the 9th of April, I was notified that a dead horse was lying on the property of Mr. F. J. Chadwick, I sent and

had it removed to the city nuisance ground. On the 29th of May, a complaint was made by Mr. Dawson, of a nuisance which existed in the shape of two dead horses, I had them buried and threw two bushels of lime on them. On the 30th of May, I was instructed by Mr. Thos. McCrae, chairman, to pay a visit to Mr. Andrew McConnell, as it had been reported to him that a dead cow was lying on his premises. I visited the place but found that although there had been a dead cow there some time before still it had been disposed of. On making a closer examination of the place I found the house inside and outside was in a filthy condition and was in my opinion injurious to the health of himself and family and I instructed McConnell to have the place put in a proper sanitary condition. As he was working at the Ontario Agricultural College and earning good wages I reported the matter to Professor Mills, and he told him that unless he kept his place in a proper condition he would be discharged. During the past year a number of dead animals having been picked up and buried from different parts of the township. The amount expended by me in visiting places where complaints were made during the past year have been \$9.50. Burying dead animals \$4.00. In conclusion I am happy to say that my work as sanitary inspector for Guelph township has been of a very agreeable nature during the past year.

W. CLARKE,
Sanitary Inspector.

GARDEN ISLAND.

CHAIRMAN'S REPORT.

The Local Board of Health for the village of Garden Island beg leave to report that an outbreak of diphtheria took place amongst the children here in September. There were twenty-seven cases reported, six of which proved fatal. We caused examinations to be made on two occasions by two physicians from the city of Kingston, to endeavor if possible to locate the cause of the outbreak. They were not quite decided on this point but recommended the closing of the public schools, isolation as far as practicable of the sick ones, flushing of certain drains, and the fumigation of certain premises, all of which we saw was done. As there have been no new cases developed for over a month we hope the disease has now been stamped out. The public schools were reopened on Monday, 18th.

Apart from this outbreak of diphtheria the general health of the inhabitants has been first class.

A. CALVIN,
Chairman.

HINCHINBROOKE.

SECRETARY'S REPORT.

I have to state that the Board has had no occasion to meet this year. There has been no sickness of a contagious kind, nor in fact of any kind to speak of, only three or four deaths in all in the township, and none of them were from contagious diseases. We had no need for a medical health officer. The sanitary condition of the township seems to be all that could be desired. The people all take an interest in keeping their places in a good state of cleanliness.

JOHN HAMILTON,
Secretary.

HULLETT.**MEDICAL HEALTH OFFICER'S REPORT.**

It is again my pleasant duty to report regarding the sanitary condition of our township for the past year. We have had during that time a few cases of typhoid fever and one death; but in no case was it traceable from one house to another. We have had three cases of diphtheria and one death; this disease was contracted by the family while visiting in another township. Hygienic and disinfectant measures were promptly attended to, and the spread of the disease prevented. At present the township is tolerably free from all infectious diseases and nuisances of any kind.

O. YOUNG, M.B.,
Medical Health Officer.

HUMBERSTONE.**MEDICAL HEALTH OFFICER'S REPORT.**

I have this year as formerly given my best attention to the sanitary condition of the municipality. I may say that through the exertions of the inspector, coupled with those of my own, health conditions about the village have been fairly maintained, and nuisances of one kind and another that were developing, abated. A stolid indifference by some of the village inhabitants, in properly locating and disinfecting water-closets, I have, unfortunately, found to exist; together with erecting pig-styes near roads and dwellings. In some instances no sanitary status could be effected without threats of invoking the corrective force of the health laws. Zymotic diseases during the year have prevailed to some extent. Whooping-cough has been quite prevalent, but there have been no fatal results from it, or its sequences, so far as I know. Parents allowed it for the most part to run its course without scientific treatment. A few simple cases of measles have occurred, ending favorably. My attention has been called to only two cases of scarlet fever, one was treated by myself; the infection was imported from Buffalo. The other was treated by Dr. Neff, he could not trace the source of the infection—both patients recovered. The usual isolation and disinfection were adopted, and no one suffered from the infection. There have been a few cases of typhoid fever; one proved fatal, being an old person partially paralytic, who caught the disease in Buffalo. The other cases were supposed to have been caused by typhoid germs, or microbes from either wells getting lower than usual, or through the effects of drought, or from the atmosphere which seemed to be poisoned during the hot weather with a sort of germ dust. These cases received the best isolation and disinfection possible. Since my last report I successfully vaccinated seventy-nine persons, mostly children by direction of the reeve, and at the expense of the municipality. Those who were vaccinated before my last report, and who had paid for the same were reimbursed by me as directed by this officer, when the council decided to pay all the changes for vaccination. Other diseases than zymotic have prevailed during the year, but to a small extent. The butcher shops have been kept in a good sanitary condition, and their meat has been of a good wholesome quality. No public dairy business has been conducted in the municipality this year, but considerable milk has been purchased by some of our citizens from Mr. Geo. Hiltz, who keeps a dairy at Port Colborne, the milk has been of good quality.

M. F. HANEY, M.D.,
Medical Health Officer.

HALDIMAND.

MEDICAL HEALTH OFFICER'S REPORT.

I beg to state that it is a matter for congratulation that we have been so mercifully spared from visitations of serious and fatal epidemics.

The cases of contagious and infectious disease which have been brought to the attention of your medical health officer have been in every case sporadic ones, that is, in no way connected with an epidemic.

In the month of November, 1888, diphtheria broke out in the dwelling of Mr. C. Lane, but was confined to one patient. An investigation of the cause of the disease was made and ascertained, and I believe as far as possible removed.

In December, of same year, a case of diphtheria occurred at the residence of Mr. Robt. Rodgers (Front Road). It was thought at one time that it arose from the individual being in close proximity to a young woman dead from the same disease. On investigation such was found not to be the case, but the residence and environments of the patient were in an unsanitary condition and likely to cause the disease.

In this case as in the former one recovery ensued.

On May 24th, 1889, a case of typhoid fever occurred at the residence of Mrs. Larmer, Grafton. The locality was inspected by your sanitary inspector and myself, the cause ascertained and orders given for its removal.

The above includes all the contagious diseases of this township for the past year, that have been brought under the cognizance of your medical health officer.

I beg to embody in this report a short reference to the annual meeting of the Provincial Board of Health, at Brockville, in the latter part of August. This meeting was a most enthusiastic and interesting one, and profitable to the furtherance of a still better condition of sanitation throughout this Province.

The papers read and discussed on the subject of drainage and sewage brought out the views of the most competent authorities of this country. The question of the preservation of the physical health of the young, particularly in its bearing on the special senses, such as sight and hearing and the early causes which destroy or prevent their function brought out some of the fallacies existing in our public school system.

A resumé of the debate by Dr. Higgins, state medical health officer for the State of Missouri, and his remarks on the causes of disease and how to prevent it closed a most interesting meeting, and it is safe to assert that at no very distant time the duty of the physician will be much more important in preventing disease than in curing it.

W. W. BOYCE, M.D.,
Medical Health Officer.

HAWKESBURY, WEST.

MEDICAL HEALTH OFFICER'S REPORT.

In submitting my report for the current year, I am sorry that I cannot give you a full and accurate account of all the cases that should be reported to me by the attending physicians.

During the early months of the year there were a great many cases of pneumonia and bronchitis of a severe type, a few having ended fatally. During the summer months there was not the usual amount of diarrhoea, and the cases not severe.

8 (B. H.)

Measles and whooping-cough are just now making their appearance in the municipality, and I am afraid unless some action is taken to prevent the spread of these diseases, there will be a different report to make next year, already there is one death from measles and two from whooping-cough.

I have to report a few mild cases of diphtheria during the year, none having proved fatal.

G. J. McINTOSH, M.D.,
Medical Health Officer

HAWKESBURY, EAST.

CHAIRMAN'S REPORT.

The Local Board of Health, of the township of East Hawkesbury, have no difficulty in carrying out the health law, as the inhabitants now understand the necessity of strict regulations in regard to the prevention of contagious diseases.

We had only a few cases of diphtheria and scarlet fever during the year.

The physicians practising in the township are doing their duties as to notifying the Health Officers of any contagious diseases.

A. ROUTHIER,
Chairman.

HARVEY.

SECRETARY'S REPORT.

There has been one case of diphtheria, Dr. McCamus immediately notified me of it. House placarded and isolated. The Local Board ordered certain grocers to supply all their wants. The case was that of a married woman—she recovered. We had the house thoroughly cleaned, papered and disinfected with carb. acid, merc. chloride and sulphur, and so stamped it out.

The village (Bobcaygeon) Board of Health kept a close watch on the family and the connections in village.

The afflicted one lived close to the boundary of Harvey and the village, so the authorities were very strict in keeping away all outsiders.

I am very very glad to be able to report that our township is free from all infectious and contagious diseases, the above reported case of diphtheria is the only one we have had this year.

JAMES S. CAIRNDUFF,
Secretary.

HAGARTY.

SECRETARY'S REPORT.

With the exception of measles, which prevailed for a long time in part of one settlement in the early part of last spring, the municipality has been entirely free from all contagious deceases.

The high attitude, rolling ground, rapidly running streams and the large tracts of ever green forests, all combined, seem to render this an exceptionally healthy part of the country. The Local Board of Health has to be always on the alert, owing to our being in direct communication with many cities.

THOMAS ROCHE,
Secretary.

HIBBERT.

MEDICAL HEALTH OFFICER'S REPORT.

I am happy to state that at the present time the municipality appears to be free from contagious diseases, and since my last report, so far as I can learn, there have been no deaths from such in the township.

We have had only one severe case of typhoid fever, which was imported from Niagara. Necessary precautions were taken to prevent the spread of the trouble which happily succeeded.

There was an epidemic of scarlatina during the early part of the summer. It spread over a considerable portion of the township and visited a number of families, without, however, any very serious results.

Later on, whooping-cough visited us and is still with us. The little patients are being isolated as well as possible under the circumstances.

One or two complaints reached the members of the Board regarding nuisances, but on being notified the parties creating them had them removed. The school premises were visited and found in a reasonably satisfactory condition from a sanitary point of view.

It would add to the completeness and interest of our Annual Report if physicians and others would faithfully report to the Board all cases of a contagious nature that come to their notice.

A. D. NASMITH, M.D.,
Medical Health Officer.

HOUGHTON.

CHAIRMAN'S REPORT.

This municipality during the past year has been remarkably free from contagious diseases, and the general sanitary state of the township as well has been good. In the south-east part of the township there have been a few cases of malarial fever, but no deaths occurring therefrom. During the early part of the season a slight alarm was raised in the south part of the township in consequence of the disinterment of a body, after having been buried some years, small-pox having been the cause of death. The necessary precautions were taken and no bad results followed.

CHAS. DICKINSON,
Chairman.

INNISFIL.

SECRETARY'S REPORT.

In presenting to you the Annual Report of the Local Board of Health of the township of Innisfil, I have much pleasure in saying that the general health of the township for the past year has been good, and that the township is in an excellent sanitary condition.

CHARLES PALLING,
Secretary.

KING.

SECRETARY'S REPORT.

I have to report that during the past year the township of King has been tolerably free from contagious diseases. The only case requiring the serious attention of our health inspector was that of one family in the village of Lloydtown. Owing solely to the filthy condition of the premises in which they lived diphtheria broke out in the family and out of seven cases three proved fatal. Prompt measures were at once taken to prevent the spread of the disease; the premises were thoroughly cleansed and disinfected and now all danger of infection is past.

The general health of the township is at present good, with the exception that "la grippe" has given quite a number a friendly call.

L. E. HAMBLY,
Secretary.

KEPPEL.

SECRETARY'S REPORT.

I am pleased to say that the health of this municipality has been exceptionally good during the past year—the death-rate being much below the average. The only disease which has taken an epidemic form during the past year being a light form of German measles, very few families in this municipality escaping infection; no deaths resulting from this cause. Also an outbreak of diphtheria, which, by prompt action, was very soon stamped out. There has been but one case of death reported to me from infectious or contagious diseases during the year—a child of six years dying of diphtheria. The sanitary condition of the municipality is very much improved, caused by better drainage from dwellings and the water supply. The work of the sanitary inspector has been light during the year, very few complaints of nuisances having been made.

GEORGE ATKEY,
Secretary.

KINLOSS.

SECRETARY'S REPORT.

I am happy to be able to report the township of Kinloss in a good sanitary condition. The health of the inhabitants has been very good during the year. A few cases of diphtheria occurred, principally in one family. The attention of the Board was called to it by our very efficient medical health officer; the house was placarded and the school closed for a short time, which arrested the spread of the disease.

PETER REID,
Secretary.

KINGSTON.

MEDICAL HEALTH OFFICER'S REPORT.

I beg leave to report that the sanitary condition of the township has been very good during the past year. That we have not been visited with any serious epidemic beyond a few cases of malarial fever which were not confined to any particular locality.

M. J. BROWN, M.D.,
Medical Health Officer.

KINLOSS.

MEDICAL HEALTH OFFICER'S REPORT.

The year 1889 was ushered in by a very general epidemic, of a mild form, of measles throughout our township, which gradually died away in the month of March. I visited one or two of the schools at that time, but did not consider it necessary to take any steps in the matter.

In the month of June Dr. D. A. MacCrimmon reported a case or two of diphtheria in the family of Mr. Rennie, teacher in S. S. No. 7. I at once visited the place, ordered the school to be closed, placarded Mr. Rennie's house, and took such steps as effectually stamped it out. In the present month, November, another outbreak of diphtheria of a more serious character occurred around Kinlough and west of Holyrood. On receiving notice of the outbreak I immediately placarded the houses in which there were cases and gave the people such instruction in regard to sanitation as I hope will prevent it spreading. I must say that I find the people alive to the importance of the efforts of the Board to suppress infectious and contagious diseases and readily lend a hand to aid them in their laudable efforts.

There is only one slaughter house known to me in the township and I am pleased to be able to give a very favorable report of it. I visited it several times during the past summer and always found it neat and clean. The cheese factories also have been much improved and no complaints have been heard during the past season. I regret to have again to draw your attention to the very unsatisfactory sanitary state of our schools and school grounds. The ventilation of the school room has received little if any attention, the only supply of air being from the door or peradventure a broken window. No attempt has been made to drain the grounds and nature has been left to adorn them. It is to be hoped that during the next season some efforts will be made to remedy these evils.

JOHN S. TENNANT, M.D.,
Medical Health Officer.

KINCARDINE.
MEDICAL HEALTH OFFICER'S REPORT.

No infectious or contagious disease came under my notice during the year and therefore I can report very favourably as to the general good health of the people.

There was a case or two of diphtheria of a very mild type which was thoroughly isolated and prevented from assuming serious proportions. No nuisance existed in the municipality. Good health prevails among the people, which is a proof of the good sanitary condition of the surroundings.

THOS. BRADLEY, M.D.,
Medical Health Officer.

LOUTH.**SECRETARY'S REPORT.**

In reporting the sanitary condition of this township, I would say that typhoid fever is now prevalent and in some cases of a virulent type. Two cases have been fatal, four have recovered, and three cases still linger. The death-rate for the first six months was eleven and for the last three months fourteen—the largest death-rate known in this township for so short a time. The sanitary condition of the township at present is generally considered good. The physicians attending typhoid patients report the cause of the disease attributable to impure water.

CLARKE SNURE,
Secretary.

LONDON.**SECRETARY'S REPORT.**

The slaughter houses and cheese factories in the township were inspected during the season by either the medical health officer or sanitary inspector and found to be in a fairly satisfactory condition. Some complaints were made by ratepayers about slaughter houses after the first inspection, which were subsequently attended to by the inspector and the causes for such complaints remedied as far as possible. There was only one case of sickness, diphtheria, reported. The house was placarded by the inspector.

JAMES GRANT,
Secretary.

LOBO.**SECRETARY'S REPORT.**

The Board called the attention of the council to the advisability of having the children of the township vaccinated. The council did not deem it expedient to take any action in the matter at present.

The Board attended to all matters that have come under their notice. The work of the Board this year has been very light owing to the general sanitary condition of the township being good.

E. R. BARCLAY,
Secretary.

MACAULAY.**MEDICAL HEALTH OFFICER'S REPORT.**

I have much pleasure to report that the public health of the township of Macaulay up to the first of November has been very good.

There have been three cases of typhoid fever, but in each case the disease did not extend to more than one member of the family, and none of them proved fatal.

Early in November two families living on the west side of the river were attacked with diphtheria and a death occurred in each family. Unfortunately and contrary to my instructions a Mrs. Rykeman, who went to help nurse her brother's children, returned home, and within a week after her return three of her children were attacked with the disease, and two of the number succumbed to its dread influence. This case ought to be a lesson to the community at large, and clearly establishes the fact that diphtheria can be carried in the clothing from one place to another.

At the present time another family also on the west side of the river have the disease, and I am informed that one member of the family has died.

In conclusion I must thank our Board of Health for the prompt and efficient means taken by them to carry out my instructions and those laid down by the Provincial Board of Health, and thus prevent the spread of this class of diseases. I would suggest that the Board appoint an inspector whose duty should be to carefully examine and report, where necessary, upon the sanitary condition of the inhabitants of the township. It too often happens that when diphtheria does break out the surroundings are just such as to engender and foster the disease.

S. BRIDGLAND, M.D.,
Medical Health Officer.

McNAB.**SECRETARY'S REPORT.**

As there was no epidemic or case of contagious disease reported to the Local Board of Health nor any nuisance complained of in the past year, the Board thought it unnecessary to call a meeting. I am pleased to be able to report that the sanitary condition of the township at the present time is excellent.

J. D. McNAB,
Secretary.

MARYBOROUGH.**MEDICAL HEALTH OFFICER'S REPORT.**

I am pleased to state that the sanitary condition of this township during the past year has been very favorable. The only complaint of a nuisance existing was made a few days ago by a farmer on the sixth line. The complaint was that a water-closet was placed over a closed drain which emptied into an open ditch, and the water in this flowed close by a spring, which is claimed was used for household purposes. I made an examination of the place and found it as stated. I ordered its removal, which was done. Also, I condemned the use of the water in said spring, as it is unprotected. A large section of land being drained into this ditch, which at high water flows over the spring, carrying the excreta of animals pasturing on the land thus drained, as well as decayed animal and vegetable matter, which being deposited in and around the spring renders its use dangerous.

If there has been any other nuisance existing the people themselves are to blame in not reporting to the Board, as any matter of that nature would be promptly attended to.

We have had comparatively few cases of infectious or contagious diseases this year.

No cases of scarlet fever occurred to my knowledge. Several mild cases of measles and whooping cough came under my own notice, but were confined to the families in which the disease started. Five cases of diphtheria occurred, and two deaths, without any further spread of the disease.

There were fifteen cases of typhoid fever during the hot summer months, but of these only four assumed a severe form; all however made a good recovery. The cause in several of these cases could be traced to the use of impure water; in the others no cause could be found, as the sanitary condition of the surroundings was good.

In conclusion I may say that a full and correct report of the number of infectious or contagious disease cannot be given unless medical men practising in other parts of the township will report cases which they may be called on to treat.

J. J. CASSIDY, M.D.,
Medical Health Officer.

MACHAR.

SECRETARY'S REPORT.

I beg to report as follows:—That in the month of September of this year a number of cases of typhoid fever occurred in the village of South River in this township, which were attended by Dr. Toole, of Sundridge, Dr. Howland, of Huntsville, and Dr. Caughill, of Burk's Falls. On the 29th September two deaths were reported, and considerable excitement prevailed in the village. At the suggestion of Dr. Howland the secretary of this Board wrote reporting the matter to the secretary of the Provincial Board of Health asking for information and assistance, to which letter no reply was received.

This Board met on the 14th of October, but in the absence of information or instructions from the Provincial Board could do nothing.

The secretary subsequently wrote to the Honorable the Minister of Agriculture, also to the local member, again asking for advice and assistance, but the only answer received was a letter from the Honorable Minister of Agriculture, who acknowledged the receipt of the letter and promised to consult Dr. Bryce, the secretary of the Provincial Board, on his return from New York.

The Local Board having no funds available to employ a qualified person to ascertain if any local cause existed that could be remedied, are powerless to prevent the recurrence of a similar outbreak at any future time.

Popular opinion is divided as to whether it is caused by the flooding of the lands in consequence of a dam erected by lumbermen to raise the water in the river to float their lumber, or from the water in the wells being contaminated from soakage through the porous soil on which the village is built.

R. COLE,
Secretary.

MACHAR.

MEDICAL HEALTH OFFICER'S REPORT.

I have had eight cases of typhoid fever under medical treatment, six of which recovered and two died. All of these cases were in the South River and immediate vicinity.

Personally I cannot assign any reason for the recent epidemic in South River, although I have heard from others that it was no doubt due to stagnant water in some pond near by. The fall of the year is the time when we expect such fevers to prevail, and many times we cannot trace it to any local cause.

At the present time the township of Machar is free from typhoid fever or any other contagious disease as far as I know.

C. CAUGHILL, M.D.,
Medical Health Officer.

MARYSBURGH, NORTH.

SECRETARY'S REPORT.

At the first session of this Board we appointed two sanitary inspectors, whose duty required them to visit all creameries, cheese factories, slaughter-houses, etc., in their jurisdiction, and enforce whatever sanitary measures deemed by them expedient. The result has been that the municipality is at present free from all contagious diseases excepting mumps, due principally to the efficient manner in which the Board and its officers performed their respective duties.

We desire to express our appreciation of the manner in which the Provincial Board of Health have enforced the provisions of the Public Health Act, and the means taken by them for the prevention and spread of disease in the province.

W. HARRISON,
Secretary.

MAIDSTONE.

CHAIRMAN'S REPORT.

I am happy to be able to report that there have been but few cases of contagious diseases during the present year in our municipality, the cause of which is owing to the prompt measures taken by the Board of Health to stamp out any of them when they make their first appearance.

GEO. A. WINTEMUTE,
Chairman.

MINTO.

MEDICAL HEALTH OFFICER'S REPORT.

The township in the year now closing has been remarkably free from any form of contagious disease. The slaughter-houses and cheese factories have been kept in good condition, and no complaints respecting them have been made.

In some school sections I think the trustees have been careless in not having the wells on the school property properly cleaned out. Their neglect to do so has in some cases caused sickness, and if not attended to in future may give rise to an outbreak of some epidemic such as diphtheria or typhoid.

W. A. HARVEY, M.D.,
Medical Health Officer.

METCALFE.**CHAIRMAN'S REPORT.**

I beg leave to submit my yearly report, and in the first place would say that the labors of the Board for the year just drawing to a close have been much the same as in previous years. The cheese factories and public schools have had the attention of our Board, and also of our very efficient inspector. And I believe where improvements have been ordered by our inspector for guarding the public health they have been willingly made. Our Board during the past year has not had any complaints to settle, consequently I have come to the conclusion that the sanitary condition of our township is good. We have had no contagious diseases or epidemics of any kind, hence the mortality or death-rate has been very low. There have been isolated cases of malaria, but none proving fatal that I am aware of.

J. TRUMAN,
Chairman.

MATCHEDASH.**SECRETARY'S REPORT.**

I have much pleasure in reporting the very healthy condition of this municipality for the last twelve months. No cases of an infectious or contagious character have been reported. The sanitary condition of the township is fairly good. Our schools have been open the full term, and no reports have reached this Board as to their sanitary condition other than good.

E. W. KITCHEN,
Secretary.

MORRISON.**SECRETARY'S REPORT.**

I beg to report that the sanitary condition of the municipality for the current year has been uniformly satisfactory. No epidemics or contagious diseases have been known to have existed. One doubtful case of typhoid fever did occur. Precautions were taken to isolate the patient as far as possible, visitors being excluded. All evacuations were immediately carried to a waste place, emptied into a hole dug for their reception and covered up. The patient recovered and is now in her usual state of health, and no fresh cases occurred, though there have been fatal cases in the neighboring township.

THOS. WHYTE,
Secretary.

McLEAN AND RIDOUT.**SECRETARY'S REPORT.**

I have much pleasure in announcing that the sanitary condition of this municipality has been unprecedentedly excellent.

Allow me to present you with a clean bill of health. It may not be amiss for us to announce to the public the salubrity of the country surrounding the beautiful Lake of Bays.

ANDREW SLEMMONT,
Secretary.

MALAHIDE.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting my report for the year I beg leave to state that the sanitary condition has been good, and we have had no epidemic of any contagious disease during the year. During the hot, dry summer we had the usual amount of diarrhoea and dysentery, followed in the early autumn by several cases of a mild typhoid, none of which were fatal.

We have had drains and cesspools cleaned, and things generally placed in a proper sanitary condition.

Vaccination was very generally attended to during the month of March as a precaution against an outbreak of smallpox, then prevalent in the neighboring township of Southwold.

JOHN J. KINGSTON, M.D.,
Medical Health Officer.

MAIDSTONE.

MEDICAL HEALTH OFFICER'S REPORT.

In compliance with the statute I have prepared the following report : The general health of this municipality during the year has been very favourable, much above the average.

The diseases of which the Board takes special cognizance, and over which it has most control, are those classed as zymotic.

Of the above class is diphtheria, which seems to have a tendency to linger in portions of the township, as shown by several cases during the year. There was one adult, Martin Graham, whose death is much to be regretted, because preventible ; for had he not returned home while the contagion was in the house he would not have taken the disease. At the present time I am not aware of any cases in the municipality. Of the same class is whooping-cough which is now quite prevalent in the south-east quarter of the township. Of the same class is also typhoid fever which has been below the average this year in prevalence.

Smallpox, measles and scarlet fever which belong to contagious diseases, I think have been unknown during the year.

R. RICHARDSON, M.D.,
Medical Health Officer.

MURRAY.

MEDICAL HEALTH OFFICER'S REPORT.

In presenting this report I am happy to state that the township has been free from contagious diseases during the past year, and that the general health of the people has been good. Our sanitary inspector has inspected several nuisances complained of during the year, and had them removed, with the exception of one which is an old cellar not in use, and contains a good deal of stagnant water which has a putrid odor. I trust that the matter will be speedily settled and the cellar filled up, for it will be a cause of disease as long as it exists in its present condition. In conclusion I congratulate our Board upon the present condition of the municipality, and sincerely trust that the same vigilance, which has characterized our Board in the past, and exerted such a beneficial influence upon the health of the people, may be exercised to a still greater degree, so that our annual reports may show the people that good may be accomplished in this way.

W. H. McKAGUE, M.D.,
Medical Health Officer.

McKILLOP.

MEDICAL HEALTH OFFICER'S REPORT.

I have again the honor of submitting the yearly health report of the municipality. We have reasons for congratulation in the fact that the general health of the township was exceptionally good during the year.

We have had no epidemics this year. In a remote part of the township diphtheria broke out in one family, two children were attacked, one died shortly after the physician's first visit, the other recovered.

This family shortly after the recovery of the child visited friends in Seaforth, the result being that the child in the house visited contracted the disease.

The family were sent back to their home in the township and the necessary precautions taken to prevent the spread of the disease.

I mention this case to impress upon your minds the necessity of complete quarantine for this disease for at least fourteen days.

W. HANOVER, M.D.,
Medical Health Officer.

MIDDLETON.

MEDICAL HEALTH OFFICER'S REPORT.

In my last report I mentioned the frequent outbreaks in diphtheria in the township. I am pleased to state that during the past year a marked improvement has taken place in this particular.

About a half-dozen cases have occurred, confined to two or three families, with no doctor. Every possible means to prevent contagion and the spread of the disease were taken by your health officer and board of health with the above result.

During the months of September, October and November a considerable number of cases of malarial fever occurred, these were of a typho-malarial type and a few deaths resulted from this cause. In the western portion of the township I attribute the disease to the presence of a large body of stagnant water in the vicinity of the town of Tilsonburg, and in the western portion no other cause can be found in the pollution of streams by throwing the sawdust of mills into them, which during the dry season becomes exceedingly offensive.

After a thorough inspection of the slaughter houses in the village of Delhi, I called a meeting of the Board of Health through its chairman and action was taken by means of which these were removed to a greater distance from the village and placed under a regular system of inspection.

Members of the Board were also appointed to make regular visits to the various cheese factories in the municipality, and also to the premises occupied by the Delhi Fruit and Vegetable Canning Company.

These visits have had a very beneficial effect on the sanitary condition of these places. Certain drains were also caused to be constructed in the village of Delhi, in order to remove all possibility of stagnant water accumulating in low places.

On the whole I believe the public health of the township to be in a better condition than at the time of last report.

J. F. HONSBERGER, M.D.,
Medical Health Officer.

MARKHAM.

MEDICAL HEALTH OFFICER'S REPORT.

I beg to report that the general health of this municipality has been very good during the past year, six cases of diphtheria were reported, three of which proved fatal; also two mild cases of measles, and one of typhoid fever, the latter being an importation from the United States.

G. M. FARWELL, M.D.,
Medical Health Officer.

MARIPOSA.

SECRETARY'S REPORT.

During the year the medical practitioners in this townships have reported four cases of typhoid fever, one of which proved fatal. Six cases of diphtheria all of which recovered. A few cases of measles and mumps, but none fatal.

We consider the work done by our sanitary inspector was good and efficient. In his efforts to carry out the requirements of the "Public Health Act" he was firm and prompt, and our ratepayers being willing to carry out his suggestions, resulted in checking the spread of the few cases of contagious diseases which have occurred.

During the year the inspector has made 135 domiciliary visits, and paid special attention to the sanitary condition of our public school houses and their surroundings. Also special attention was given to the water supply at the school grounds, which was considered satisfactory except in three cases, on the recommendation of the inspector the wells were cleaned out.

The inspector ordered the cleaning up of a number of yards, and the removal of manure heaps, also several privies were ordered to be cleaned out, and hog-pens removed.

The slaughter houses and cheese factories have also received a share of his attention.

All complaints relating to the existence of any nuisance have been promptly attended to.

As a whole the present sanitary condition of the township is most satisfactory, and we consider the establishing of the Local Board of Health has had a very beneficial result.

JOHN F. CUNNINGS,
Secretary.

MALAHIDE.

SECRETARY'S REPORT.

Upon the breaking out of an epidemic of smallpox in the municipality of Southwold, in this county, in February last, precautionary measures were taken by having any parties who had been exposed quarantined, and by issuing a proclamation calling upon all persons to avail themselves of vaccination. The Board was ably assisted in this work by the several medical men of the Town of Aylmer. No case of the disease occurred in this township.

The general health of the municipality has been good during the past season. Several cases of malaria and typhoid fever have occurred, but they have been of a mild type, and few, if any, deaths have resulted therefrom.

A few cases of nuisances were reported to the Board, but these were promptly abated upon notice being given the parties causing them, by the Board.

R. L. McCALLY,
Secretary.

NIPISSING.

SECRETARY'S REPORT.

I am glad to report that the township of Nipissing is in a good sanitary condition at this date. I am sorry to report one case of diphtheria in September, which proved fatal. The Local Board of Health of this township took every means at hand to prevent the spread of the disease by quarantining the house, disposing of the corpse, seeing to the cleaning up of the premises, and fumigating with sulphur and disinfecting with chloride of lime and carbolic acid. We experience a good deal of trouble by the people not reporting cases of the disease, they have a tendency to hide instead of reporting them. Our sanitary officer reports that he has inspected the houses throughout the township and finds that his instructions have been carried out, excepting one or two cases, as regards cleaning up of yards, closets, etc.

WILLIAM MALTBY,
Secretary.

NOTTAWASAGA.

SECRETARY'S REPORT.

In the month of April diphtheria broke out in one family, and before the case was reported to the writer five members of the family had died; the full particulars of which were reported to you in my letter of the 18th of May, rendering a recapitulation of them here unnecessary.

Under the directions of the attending physician the house and contents were thoroughly disinfected with the result that though there were five deaths in that family the disease was confined to the one house, and I am happy to say that there has been no return of the disease, and it is to be hoped that we have returned to our usual healthy condition.

With this exception the health of the township during the past year has been fair, the other deaths that have taken place having been from causes not considered contagious.

In conclusion I regret to have to say that some of the physicians practicing in our municipality often neglect their duty, by failing to report the cause of death of their patients to the township register.

ANGUS BELL,
Secretary.

NISSOURI EAST.

SECRETARY'S REPORT.

The Local Board of Health of the township of East Nissouri, in submitting their report for the year 1889, to the Provincial Board of Health, take much pleasure in stating that their duties for the year have been quite nominal. The sanitary condition of the township appears to have been good. Three cases of typhoid fever which did not prove fatal were reported.

JOHN GRANT,
Secretary.

NORMANBY.**SECRETARY'S REPORT.**

The sanitary condition of the township of Normanby is good. No nuisances have been reported. Contagious diseases do not exist, only two cases of typhoid fever of a mild form were reported, both patients recovered. Our sanitary inspector made his usual careful inspections of slaughter-houses, cheese-factories, creameries and school premises, and reports, that all are kept in a clean and proper state. Out of the 16 schools in the township, two are reported as having bad drinking water, the attention of the respective trustees was called to the matter.

The Board is doing its best to enforce the Public Health Act.

GEO. HOPF,
Secretary.

MISSOURI WEST.**SECRETARY'S REPORT.**

The work of the Board has been light. Our inspector has enforced the provisions of the Act where necessary. He has caused a number of dead animals to be buried, and compelled several parties to clean up places containing stagnant water, etc., which certain individuals complained of. And also enforced sanitary improvements in connection with several cheese-factories and slaughter-houses in this municipality. Our township has not suffered from any contagious or malarial diseases during the past year, but on the contrary has been and is at present enjoying exemption from such visitations.

J. P. LEE,
Secretary.

NORWICH NORTH.**MEDICAL HEALTH OFFICER'S REPORT.**

It affords me much pleasure to report that the health of our village population and that of the surrounding country for the past year has been fairly good. The number of infectious diseases has been very limited. In all seven cases of diphtheria have been reported in the township. There have been two cases of scarlet fever of a very virulent type in our village, with one death; but by placarding the place and by a thorough disinfection of the house and clothing, the Board of Health were glad to see that it was kept from preading any further. On March 22nd, there was considerable excitement in this locality by a report that there was a case of smallpox about eight miles distant, supposed to have been imported from Fingal. The chairman of the Board immediately instructed me to repair to the place to investigate. I did so with, I must say some reluctance, and you can imagine the happy state of mind I experienced when I found it was a false alarm. A lady from Fingal was visiting there, and while stopping at her father's, her little son had a papilla form eruption develop, without any febrile disturbance, which soon passed away and the child had so rapidly recovered that his mother had just taken her departure with him when I arrived. However, the Board thought it wise that I should vaccinate the children and adults not recently vaccinated in the neighborhood, and I did quite a

number of them. There has been only one case of typhoid fever, viz., in the Heyland family, which I attributed to drinking water from a running stream by the roadside. The case was a bad one with many complications, and the young lady after lingering ten weeks succumbed to it. There is quite an epidemic of whooping cough, but all the cases so far as I know are doing well. I consider that the immunity from epidemics in this section is largely due to the vigilance of the Board of Health and the abundance of pure drinking water.

W. R. WATSON,
Medical Health Officer.

NICHOL.

SECRETARY'S REPORT.

The secretary begs to report that so far as he knows or can ascertain, the sanitary condition of said township during the present year has been, and is very good, no epidemic of any kind having to any extent been prevalent. Also, that the several members of the Board of Health have been careful to ascertain whether any nuisance endangering the public health existed in their respective localities, and had caused the immediate removal of any such nuisance. A report has also been received by him from Dr. Paget, who was in January last, appointed Medical Health Officer of the municipality, in which he stated "that as well as he could ascertain, the health of the township of Nichol during the present year had been good, with the exception of a few cases of typhoid fever."

JAMES McQUEEN,
Secretary.

ORILLIA.

SECRETARY'S REPORT.

I am pleased to state that I have received no report of any case of infectious or contagious disease since my last report, I have only heard of one case in which it was necessary for any of our sanitary inspectors to act and the nuisance then complained of was, I understand, at once abated.

The medical health officer has made no report to me and I do not think his services were required during the past season.

The light duties we have been called on to attend to during our present term of office must, I am sure, be a matter of congratulation to all.

ALBERT FOWLIE,
Secretary

OPS.

MEDICAL HEALTH OFFICER'S REPORT.

During the past year a few deaths occurred from scarlet fever in the eastern portion of the township, chiefly during the spring months. As these cases were very imperfectly reported and in most instances not reported at all, I am unable to furnish any figures as to the extent or fatality of the disease, which, however, appears not to have been of any great extent or severity. Whooping cough has also afflicted the children in several neighborhoods and still prevail in some parts of the township, but so far as I know has caused no deaths.

With these exceptions the public health in the township has been free from any epidemic or contagious disease and has been as good as in former years.

As in this community, as well as in extensive areas of country both in Europe and America, by far the greater number of deaths, amounting to about one in seven, is due to pulmonary consumption, I think the fact now fairly established, that this terrible disease is contagious, ought to be more widely known, and greater precautions taken both in public and private to protect the healthy from a source of danger to which they are often unwittingly exposed.

The danger is contained in the spectrum or expectorated matter known as tubercle bacille, which are found in large numbers in the spectrum and multiply with surprising rapidity, the drying of this spectrum on cloths or floors sets the germs free to invade the lungs and perhaps to bring about the disease in persons, who, from constitutional or hereditary causes, are less able than others to resist a morbid influence of this kind. As the vitality of these germs is not easily destroyed the spectrum in all such cases should be burned or promptly subjected to the influence of powerful disinfectants or germicides.

The newness of these facts accounts for the little attention paid to this subject, but the time has come when the danger referred to should be made generally known with a view to the prevention, so far as possible, of a disease so widespread and so fatal, and which every year claims so many victims.

I am of opinion that more attention ought to be paid to the condition of wells and drinking water, and that good would result from a proper examination of the well water in use at our public schools.

THOMAS W. POOLE, M.D.,
Medical Health Officer.

ORFORD.

SECRETARY'S REPORT.

The Board was called together in March, 1889, to take precautionary steps to prevent the spread of smallpox from our neighboring municipalities.

Public notices were posted in all the public places and thoroughfares of the township, notices were given and by the action of the Board all magistrates, constables, school trustees, were appointed health officers. Doctors Davey and McPhail were authorized to vaccinate all the children and adults that would be, and this work was paid for out of the general funds of the municipality. All citizens were requested in said notices, to aid the Board to prevent the disease from spreading into our municipality. By the precautionary measures and kind providence we had no cases of the disease. No other diseases of a serious nature have been reported.

HENRY WATSON,
Secretary.

ONEIDA.

CHAIRMAN'S REPORT.

I have pleasure in submitting my annual report of the Local Board of Health of this township, and have only to say that the course adopted by the Board for 1888, has been continued during the year now closing, which has been to allow each member to deal with cases requiring the attention of the Board. All such cases have been promptly dealt with and at a less cost to the township than if regular meetings were held.

No epidemic or disease requiring to be dealt with has come under our observations or has been reported to us by our medical health officer, so that we can say the sanitary condition of the township is good.

MATTHEW SPRATT,
Chairman.

OXFORD, NORTH.
MEDICAL HEALTH OFFICER'S REPORT.

For the year 1889 I beg to report as follows: First, I have to congratulate our Board on the fact that our municipality has suffered very little from epidemics of any kind during the past year. The only outbreak that occurred during the year was one of chickenpox, which is now in progress. There have been a few sporadic cases of diphtheria and scarlet fever, but all of a mild character and all resulting in recovery. There has also been a number of cases of typhoid or so-called malarial fever, some fifteen or sixteen cases coming under my observation. A number of these have been very severe, though all resulted in recovery. In this connection I would respectively draw the attention of our Board to the danger arising from allowing the discharges of typhoid or malarial fever patients, to be emptied on the surface of the ground or into privy pits, as in those circumstances it will act as a fresh source of poison, and be almost sure to produce the disease at a future time. Such passages should often be disinfected, be buried in the ground in as dry a soil as possible, and at such a depth as will insure their not being readily exposed by plowing or other excavation of the soil, and all closets which may have become the receptacle of such typhoid fever discharges before the nature of the trouble has been recognized, should be thoroughly disinfected, and the contents buried to the depth of at least eighteen inches with dry earth.

J. McWILLIAM, M.D.,
Medical Health Officer.

ORO.
MEDICAL HEALTH OFFICER'S REPORT.

In returning my report of the sanitary condition of the township, I have much pleasure in stating that very few cases of infectious diseases have come under my notice where the causes could be attributed to anything like a filthy condition of the surroundings.

Concerning the outbreak of scarlet fever in Edgar and vicinity, I must report that no specific cause or possibility of contagion could be found, though a few isolated cases occurred later, yet its limitation should be gratifying. Of twelve cases one was fatal. One other fatal case at the same place and time could not with certainty be attributed to the same cause. Of diphtheria only three or four cases appeared and the cause could not be ascertained.

In regard to typhoid fever I am glad to report that most of the township has been very free from it. Of seven cases treated two have come from outside, and in others no positive cause for the disease could be found. The results of these were all favourable. Concerning the Rugley cases where I was asked to inspect the premises, I must report that considerable improvement might be made, a complete removal of all offensive matters, including the pigs, should be insisted on. In both families I think an earnest endeavor is being made to keep the water closets in a healthy condition. A means of draining away the filth should be afforded to keep it from the school well, which I have been informed is not in a good sanitary state.

In connection with the above I would suggest that all physicians attending cases of infectious diseases and typhoid fever in Oro, should be requested to report the same at once to your Board or health officer, in order that a full and correct account might be submitted.

There is one other point to which I would like to draw your attention. In the township burying grounds are scattered broadcast, and some of these are in most unsuitable places and afford most ready means to spread contagion. To remedy this the municipal council should provide a common burying ground in a suitable locality where every chance of spreading disease would be avoided.

W. H. OLUTTON, M.D.
Medical Health Officer.

ALPHABETICAL INDEX.

D.

| | PAGE. |
|-----------------------------------------|---------|
| Diphtheria, remarks regarding | xxxvii. |
| Disease, outbreaks of | xxxiii. |
| Diseases in Animals, outbreaks of | xli. |

F.

| | |
|-----------------------------------------|-------|
| Fever, Typhoid, remarks regarding | xli. |
| Fever, Cerebro Spinal | xli. |
| Flour Moth, Suppression of | xlii. |
| Food Supplies, inspection of | xii. |

G.

| | |
|--------------------------------------|--------|
| Ground Waters | xvii. |
| Ground Waters, sources of | xviii. |
| Ground Waters, constitution of | xxiii. |

M.

| | |
|---------------------------------|-------|
| Municipal Health Progress | viii. |
|---------------------------------|-------|

N.

| | |
|-------------------------------|------|
| Nuisances, abatement of | xiv. |
|-------------------------------|------|

P.

| | |
|--------------------------------------------------------------------|-------|
| Poisons, report of committee on | liv. |
| Public Health Act Amendments <i>re</i> sale of Milk and Meat | xiii. |

R.

| | |
|---------------------------------------------------------------------------------------------------------|---------|
| Report of Secretary | vii. |
| Report on Nuisance in River Speed, Guelph | xvi. |
| Report on the Outbreak of Small-pox in Elgin County | liii. |
| Report <i>re</i> an outbreak of Disease at Sandford amongst Horses | lv. |
| Report on the Porous Carbon System for Precipitation of Sewage at Ontario Agricultural College | lxii. |
| Report on a Fat-rendering and Hog-feeding establishment in York Township .. | lxv. |
| Report <i>re</i> Nuisance in East Zorra from Hog-pens in connection with a Cheese Factory | lxvii. |
| Report on Union School, Simcoe | lxviii. |

S.

| | PAGE. |
|--------------------------------------------------------|---------|
| Sewerage and Drainage systems where in operation | x. |
| Sewage Disposal in England, report on methods of | lvi |
| Sewage Farm at London Asylum, report on | lx. |
| Smallpox, outbreak of, in Elgin County | xxxiii. |
| Smallpox, outbreak of, on Pelee Island | xxxiv. |
| Soil drainage | xi. |

W.

| | |
|--------------------------------------------|----|
| Waterworks, places where constructed | x. |
|--------------------------------------------|----|

ANNUAL REPORTS OF LOCAL BOARDS OF HEALTH :

CITIES.

| | PAGE. | | PAGE. |
|------------------|-------|----------------------|-------|
| Brantford | 3 | London | 14 |
| Belleville | 7 | Ottawa | 16 |
| Guelph | 7 | St. Thomas | 18 |
| Hamilton | 9 | St. Catharines | 19 |
| Kingston | 13 | Toronto | 20 |

TOWNS.

| | PAGE. | | PAGE. |
|---------------------|-------|-----------------------------|-------|
| Barrie | 27 | Oakville | 36 |
| Bowmanville | 28 | Owen Sound | 36 |
| Bothwell | 28 | Peterboro' | 37 |
| Brockville | 28 | Perth | 39 |
| Chatham | 29 | Picton | 40 |
| Collingwood | 30 | Port Hope | 41 |
| Dresden | 31 | Port Arthur | 41 |
| Dundas | 31 | Simcoe | 42 |
| Galt | 32 | Strathroy | 43 |
| Goderich | 32 | Seaforth | 44 |
| Harriston | 33 | St. Mary's | 44 |
| Lindsay | 33 | Trenton | 45 |
| Milton | 34 | West Toronto Junction | 46 |
| Meaford | 34 | Walkerton | 47 |
| Niagara Falls | 35 | Windsor | 48 |
| Napanee | 35 | | |

VILLAGES.

| | PAGE. | | PAGE. |
|--------------------|-------|---------------------|-------|
| Alexandria | 49 | Niagara Falls | 54 |
| Alvinston | 49 | Oil Springs | 54 |
| Acton | 50 | Preston | 54 |
| Bath | 50 | Port Elgin | 55 |
| Blyth | 50 | Port Edward | 55 |
| Belle River | 51 | Port Stanley | 55 |
| Bolton | 65 | Southampton | 56 |
| Chippewa | 51 | Stouffville | 56 |
| Cardinal | 52 | Stirling | 56 |
| Dunnville | 51 | Streetsville | 57 |
| Exeter | 52 | Thedford | 57 |
| Fergus | 52 | Watford | 58 |
| Millbrook | 53 | Waterdown | 58 |
| Morrisburg | 53 | Warton | 58 |
| Merrickville | 53 | Wardsville | 59 |
| Markham | 54 | Wellington | 59 |

TOWNSHIPS.

From page 60 to page 130.

ERRATUM.—Owing to an oversight, the townships in a few instances do not follow in alphabetical order.

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on
or before the date last stamped below.

| | | |
|--|--|--|
| | | |
|--|--|--|



1

